Missiles and Rockets Editorial Index

Readers are invited to save the following six-month index covering M/R issues of Jan. 5, 1959 through June 29, 1959. This index is a reference guide to major news and technical articles published in M/R during the first half of the year.

ASTRIONICS

Antennas

NARMCO PROJECT; Radar reflector said to sharply cut weight, cost, by M/R Staff, 3/23/59, p. 40.

Checkout

BIG PUSH FOR AUTOMATIC CHECKOUT; Fully transistorized systems are rapidly being developed —one is operational, by Charles D. LaFond, M/R Associate Editor, 6/29/59, p. 39.

Communications

SUCCESSFUL AME IS UNVEILED; Page Communications' gear tested in North Atlantic is expected to find more use on ionoscatter circuits and offers potential for increased channel capacity, by Charles D. LaFond, M/R Associate Editor, 6/22/59, p. 33.

COMMUNICATIONS SATELLITES: A LARGELY NEGLECTED FORCE FOR PEACE; Long-proposed space relay system, now technically and economically feasible, still gets little non-military attention, by Hal Gettings, M/R Associate Editor, 5/11/59, p. 38.

TO THE EDGE OF INTERSTELLAR SPACE; In 1962 NASA will fire minimal payload rocket and in next 8-10 years will perfect communications for receiving its data, by Hal Gettings, M/R Associate Editor, 4/13/59, p. 19.

LOW NOISE TEMPERATURES IN PARAMETRIC AMPLIFIER; by M/R Staff, 3/9/59, p. 44.

LOCKHEED DELIVERS 9-LB. RUGGED TV SYSTEM TO ABMA; by M/R Staff, 2/16/59, p. 24.

Components

USAF REPORTS ISSUED ON CAPACITORS, TRANSISTORS; by M/R Staff, 2/9/59, p. 79.

GE USES 'WOOFERS' TO TEST COMPONENTS; by M/R Staff, 1/12/59, p. 31.

Computers

NCR TO RESEARCH PHOTOCHROMIC MEMORY; by M/R Staff, 5/29/59, p. 32.

DAHLGREN DEVELOPS COMPUTER; Used for Polaris, machine will handle half-million bits of information each second, by M/R Staff, 4/27/59, p. 29.

Data Processing

DATICO DESCRIBED AS A NEAR-UNIVERSAL TEST FACILITY; Programmed tester developed by Nortronics automatically checks out complex military hardware; company says it will sharply cut costs, by Charles D. LaFond, M/R Associate Editor, 3/30/59, p. 29.

NEW, COMPACT UNIT CONVERTS DATA IN-FLIGHT; by M/R Staff, 2/2/59, p. 31.

General

MOSCOW BRIEFS; by Dr. Albert Parry, Contributing Editor M/R, 6/22/59, p. 40.

WEST COAST INDUSTRY; by Fred Hunter, M/R Associate Editor, 6/1/59, p. 48.

ELECTRONIC OUTPUT TO DOUBLE BY 1965; What's the future for electronics in MSE? by William E. Howard, M/R Associate Editor, 5/25/59, p. 25.

GE'S NEW SLAVE MECHANIC HAS 'FINGERS'; 'Handyman'—result of four-year development—will go to work in radioactive areas, by M/R Staff, 4/20/59, p. 40.

HIGHLIGHTS OF IRE CONVENTION; Transistor output to pass $350 million by 1963; sales to near $300 million, by Charles LaFond, M/R Associate Editor, 3/30/59, p. 14.

INTEGRATED ELECTRONICS FOR SMALL MISSILES; Prime consideration in design and manufacture is that the missile be considered as a round of ammunition, by Gordon E. Sylvester, 3/2/59, p. 21.

CONTINUED GROWTH IN MILITARY ELECTRONICS; Armed Services seeking those companies with electronics capabilities to serve as missile, astronautics prime contractors, by Raymond M. Nolan, M/R Associate Editor, 2/9/59, p. 26.

FUTURE OF ELECTRONICS: GROWTH WITH ASTRONAUTICS; EIA President David R. Hull gives a probing look at missile electronics today and predicts tomorrow's uses, 2/9/59, p. 28.

THE AGE OF THE ELECTRON; Guest Editorial, by Dr. Ernst Weber, 2/9/59, p. 7.

ELECTRONICS BUYING SHOWS QUARTERLY INCREASE; by M/R staff, 2/2/59, p. 31.

AMPHENOL AND BORG FIRMS MERGE ELECTRONICS OUTPUT; by M/R Staff, 1/19/59, p. 27.

1958 ELECTRONIC SALES HIT RECORD $7.7 BILLION; by M/R Staff, 1/12/59, p. 27.

TWO NEW REPORTS ISSUED ON ELECTRONICS; by M/R Staff, 1/5/59, p. 29.

Infrared

UNIT COOLS IR GEAR TO AS LOW AS 60° K; by M/R Staff, 5/25/59, p. 32.

AVION DEVELOPS NEW IR SEARCH SYSTEM; CODES, built around commutating infrared detector, will be modified for satellite tracking, by Charles D. LaFond, M/R Associate Editor, 4/20/59, p. 32.

TWO APPROACHES FOR COOLING IR DETECTORS; by M/R Staff, 2/16/59, p. 23.

SERVO CORP. MANUFACTURES 12-INCH IR DOME; by M/R Staff, 2/16/59, p. 24.

Guidance

MIDCOURSE GUIDANCE IS NECESSITY FOR INTERPLANETARY TRAVEL; Venus flight would require orbit about the sun and eventual capture by planet, by L. T. Seaman, 2/9/59, p. 40.

SPACE NAVIGATION POSES NEW REQUIREMENTS; Automatic, self-contained inertial systems will be required to provide precise velocity vector control, by Frederick Stevens, 2/9/59, p. 37.

INTERPLANETARY GUIDANCE FOR MAN IN SPACE; Existing components will be accurate enough for unmanned probes with possible radio control for cutoff and staging. But next generation of manned vehicles will impose a different set of requirements headed by reliability, by Lawrence S. Brown, 2/9/59, p. 67.

THE HOW AND THE WHY OF INERTIAL GUIDANCE; While basic principles have been known for many years, solution of some of the problems peculiar to ballistic missiles is only now becoming a reality, by F. K. Mueller, 2/9/59, p. 49.

SIMPLIFIED GUIDANCE PROPOSED; by M/R Staff, 1/12/59, p. 27.

LEAR DESIGNS GUIDANCE FOR MANNED SATELLITE; Broad features appear feasible in system for integrating accelerometers and retrofitting 'Bootstrap' gyros, by M/R Staff, 1/5/59, p. 26.

Gyros

FREE ROTOR GYROSCOPE DEVELOPED BY AUTONETICS; by M/R Staff, 5/11/59, p. 21.

ROLL REFERENCE GYRO STARTED BY SPIRAL SPRING; by M/R Staff, 3/9/59, p. 44.

NEW APPROACH FOR LIQUID FLOATED GYROS; Norden Division of United Aircraft gets patent for unheated gyro that mechanically compensates for temperature variations, by M/R Staff, 2/16/59, p. 18.

GYRO DRIFT DEMANDING NEW MEASUREMENT TECHNIQUES; by Ralph Hookway, 1/19/59, p. 22.

SPERRY DEVELOPS NEW FLOTATION FLUID; by M/R Staff, 1/12/59, p. 27.

Measurement

NEEDED: NEW VELOCITY MEASUREMENT UNIT FOR SPACE; Is the Optik—based on speed of light—the answer for the confusion in scientific terms? by Maj. William C. Mannix, USAF, 4/27/59, p. 21.

LET'S CONSIDER THE OPTIK; editorial, by Clarke Newlon, M/R Executive Editor, 4/27/59, p. 7.

GYRO DRIFT DEMANDING NEW MEASUREMENT TECHNIQUES; by M/R Staff, 1/19/59, p. 22.

Miniaturization

GE OFFERS NEW MICROMODULAR CONCEPT; Company claims eraser-size device named TIMM utilizes heat losses and lends itself to stacking for varied uses, by M/R Staff, 5/25/59, p. 28.

MINIATURIZATION—A SWELLING TIDE; Chain reaction of new breakthroughs could lead to microscopically small parts before trend runs its course, by Heyward E. Canney, Jr., M/R Contributing Editor, 6/8/59, p. 39.

Optics

GIANT MIRROR CREATED FOR NSF'S NEW OBSERVATORY; Corning's reflector largest built in 25 years, was made by 'sagging' and must cool for seven months, by Donald E. Perry, M/R Managing Editor, 2/23/59, p. 23.

THEODOLITES DETERMINE AZIMUTH FOR JUPITER; Optical-electronic combination provides method for automatic alignment and monitoring of inertial guidance systems, by M/R Staff, 2/2/59, p. 29.

Plasma

PLASMA ENGINE DELIVERS NEARLY 2-LBS.; Republic's experimental 'magnetic pinch' engine produces over 4000-lbs. at peak with 1700 sec. Ist, by M/R Staff, 6/8/59, p. 34.

ARGMA'S PLASMA JET TEST FACILITY IN OPERATION; Prototype model for aerodynamic heating tests reaches 50,000° fusing argon gas with 13,000 fps flow rate, by M/R Staff, 3/23/59, p. 39.

Power Sources

MINIATURE BATTERIES HAVE HEAVY MISSILE USE; Yardney's latest Silvercel may make possible more pre-flight tests for reliability. Early model saw service in Viking; many employed in today's birds, by Donald E. Perry, M/R Managing Editor, 2/23/59, p. 28.

Production

NEW BLOCK GROUP STRESSES MODULAR CONCEPT; by M/R Staff, 3/9/59, p. 43.

INTEGRATED ELECTRONICS FOR SMALL MISSILES; by M/R Staff, 3/2/59, p. 21.

Radar

RADAR DEFENDED AT AFCEA; by M/R Staff, 6/1/59, p. 40.

Telemetry

RECORDER SIZE AND WEIGHT CUT; Ampex AR-200 weighs one-third as much and is half the size of previous magnetic tape recorders, by Charles D. LaFond, M/R Associate Editor, 6/15/59, p. 35.

NEW BLOCK GROUP STRESSES MODULAR CONCEPT; K-Block modules produced by ASCOP can be used in various telemetering systems as well as data multicoding, by Donald E. Perry, M/R Managing Editor, 3/9/59, p. 43.

NEW COMPACT UNIT CONVERTS DATA IN FLIGHT; by M/R Staff, 2/2/59, p. 31.

EGLIN TELEMETERING CONTRACT IS FOR $500,000; by M/R Staff, 1/19/59, p. 25.

Thermo-Electricity

PROSPECTS FOR THERMO-ELECTRICITY; Heavy investment in research gives hope for long-lived power units for space application, by Hal Gettings, M/R Associate Editor, 6/22/59, p. 29.

Tracking

RADAR IS STRONGLY DEFENDED AT AFCEA CONVENTION; by Hal Gettings, M/R Associate Editor, 6/15/59, p. 40.

NASA'S PROJECT MERCURY RANGE TO COST $12 MILLION PLUS; Worldide tracking system with unprecedented reliability must be operating within year, by Paul Means and Hal Gettings, M/R Associate Editors, 4/18/59, p. 26.

AVION DEVELOPS NEW IR SEARCH SYSTEM; by M/R Staff, 4/20/59, p. 32.

SIMPLIFIED TRACKING GEAR PROVIDES MUCH DATA; Independent Sohio station uses interferometer principle to track satellites—even Lunik—and records on two-channel direct-writing oscillograph, by Donald E. Pierce, 3/16/59, p. 29.

RADIO SEXTANT CAN TRACK SUN, MOON CONTINOUSLY; by M/R Staff, 3/9/59, p. 44.

NASA PLANS INCLUDE EAST-WEST MINITRACK FENCE; Other goals are two additional parabolic dishes for continuous deep-space tracking, and developing safe tracking and communications for man in space, by Paul Means, M/R Associate Editor, 3/2/59, p. 13.

U.S. AGENCIES SILENT ON LUNIK TRACKING; by Frank McGuire, M/R Associate Editor, 2/2/59, p. 21.

THEODOLITES DETERMINE AZIMUTH FOR JUPITER; by M/R Staff, 2/2/59, p. 29.

TEMCO DEVELOPS TV SURVEILLANCE SYSTEM; by M/R Staff, 1/12/59, p. 31.

Transistors-Tubes Semiconductors

MINIATURIZATION—A SWELLING TIDE; by M/R Staff, 6/8/59, p. 39.

SIMPLE SOLION MAY FILL LOW FREQUENCY GAP; by Charles D. LaFond, M/R Associate Editor, 6/1/59, p. 39.

TUBES AND TRANSISTORS: WHERE DO WE STAND? M/R survey shows that if anyone wins 'battle' it'll be to benefit of entire industry, by Hal Gettings, M/R Associate Editor, 6/1/59, p. 41.

RCA DEMONSTRATES SOLAR CELL USING GALLIUM ARSENIDE; Company also shows new 'tunnel' diode and rectifier, calls development of vital importance, by M/R Staff, 5/11/59, p. 16.

NEW WAY TO 'GROW' GERMANIUM; by M/R Staff, 5/4/59, p. 26.

HOW NBS RESEARCHES SEMICONDUCTORS; Studies include crystal growth, electrical and optical measurements, carrier lifetime, nuclear magnetic resonance, and theory, by Charles D. LaFond, M/R Associate Editor, 4/27/59, p. 31.

RCA DEMONSTRATES THIMBLE-SIZE TUBES; by M/R Staff, 4/6/59, p. 48.

TRANSISTORS VS. TUBES; . . . are arbitrary military design specifications jeopardizing U.S. security? by Donald E. Perry, M/R Managing Editor, 3/16/59, p. 21.

PHOTO-DUO-DIODE SHUTS OFF CURRENT IN DARKNESS; by M/R Staff, 3/9/59, p. 44.

TUBE SAID TO RUN YEARS ON WEAK SOLAR POWER; by M/R Staff, 2/2/59, p. 31.

ASTROPHYSICS

Astronomy

SPACE OBSERVATORY IN THREE YEARS? NASA is spending $3.5 million to solve the remaining problems and bring a revolution in astronomy; 1.5 million pound thrust engine clusters are believed adequate, by Hal Gettings, M/R Associate Editor, 6/29/59, p. 42.

OHIO STATE TEAM MAKES LOW-COST RADIO TELESCOPE; Staff Report, 5/4/59, p. 27.

WHAT IS TOPOGRAPHY OF MOON'S OTHER SIDE? That terrain may be rougher with more craters and smaller mares, astronomer believes, by Dr. I. M. Levitt, Contributing Editor, M/R 2/16/59, p. 14.

DETECTION SEEN POSSIBLE BY STAR OCCLUSION; ACF technician proposes to AAS meeting that telescope be mounted to a space platform and stabilized by slaving it to three reference stars, M/R Staff Report, 1/12/59, p. 23.

BIG PINE TELESCOPE TO GO IN OPERATION SOON; M/R Staff Report, 1/5/59, p. 14.

General

HEAT AND METORITE IMPACT EFFECTS STUDIED; M/R Staff Report, 6/15/59, p. 22.

IONOSPHERE REPORTED BIGGER THAN SUPPOSED; M/R Staff Report, 5/11/59, p. 41.

Nucleonics

TOP SCIENTISTS FIND ARGUS OPENING NEW AVENUE TO EXPERIMENTATION; First detailed discussion of historic tests confirms theories of Christofilos, who calls for further projects, by Charles D. LaFond, M/R Associate Editor, 5/18/59, p. 37.

NUCLEAR EXPLOSIONS IN SPACE (first in a series of four articles); A scientific explanation of PROJECT ARGUS and how an electron accelerator could lead to creation of an artificial particle belt, by Prof. S. Fred Singer, M/R Contributing Editor, 3/30/59, p. 33.

NUCLEAR EXPLOSIONS IN SPACE (second of a series of four articles); Trapped radiation will be problem for manned vehicles. Close burst to ICBM could make its bomb inoperative. Defender may have to revise anti-ICBM strategies, by Prof. S. Fred Singer, M/R Contributing Editor; 4/6/59, p. 36.

NUCLEAR EXPLOSIONS IN SPACE (third of a series of four articles); High-altitude blasts seriously interfere with radio and radar. Complete knock-out of electronic defense is unlikely. Artificial release of molecules could sweep up extra ionization, by Prof. S. Fred Singer, M/R Contributing Editor, 4/13/59, p. 21.

NUCLEAR EXPLOSIONS IN SPACE (last of series of four articles); Many techniques exist for detecting trapped particles. But high-altitude bursts at some latitudes might leave no traces. Adequate inspection procedures may be difficult to establish, by Prof. S. Fred Singer, M/R Contributing Editor, 4/20/59, p. 26.

Radiation

RADIATION EFFECTS: WHAT'S BEING DONE? by Charles D. LaFond, M/R Associate Editor; 6/8/59, p. 37.

NEW DETAILS ON RADIATION; Staff Report; April 6; p. 40.

PARAFFIN WAX MAY BE BETTER FOR SHIELDING; Researchers feel hydrogen atoms in wax could absorb more neutrons than plastics, by W. C. Parle and A. M. Erskine, 3/16/59, p. 34.

RADIATION CAN BE AVOIDED; Van Allen advocates polar launchings; proposes that two radiation belts be mapped by 100-pound payload satellite, by Norman L. Baker, M/R Associate Editor, 1/5/59, p. 13.

INNER VAN ALLEN RADIATION BELT IDENTIFIED; Staff Report; 6/15/59, p. 39.

MANAGEMENT & GOVERNMENT

Air Force

AF SEES IMPROVED SYSTEM MANAGEMENT; Weapon System Project Offices are reportedly getting the job done more efficiently although there's still the problem of just when production people should take over, by Betty Oswald, M/R Associate Editor, 6/29/59, p. 35.

AF PUSHES RESEARCH ON DETONATION PROBLEM, by James Baar, M/R Associate Editor, 6/15/59, p. 23.

U.S. DECIDES TO PUSH ALBM—'INVULNERABLE' DEFENSE WEAPON; Douglas wins competition and begins design study based on concepts tested by Lockheed, Convair and Martin; GE said to have guidance contract, by James Baar, M/R Associate Editor, 5/18/59, p. 19.

BOMARC WILL SOON MOVE INTO U.S. AIR DEFENSE ROLE; Boeing surface-to-air missile goes to first base this fall, may displace Nikes, by James Baar, M/R Associate Editor, 5/4/59, p. 15.

THE DEATH OF A MISSILE; One of 40,000 parts fails and a 75-foot bird of space (Atlas) blows up—pictures by Cornell Capa, story by Erica Karr, M/R Associate Editor, 5/4/59, p. 17.

ANDERSON PROMOTED FROM ARDC TO HEAD AMC; Popular commander becomes a contender for chief of staff after hectic but rewarding efforts to speed missiles, by James J. Haggerty, Jr., M/R Contributing Editor, 3/9/59, p. 18.

Army

MEDARIS GIVES HIS BASIC PROCUREMENT PHILOSOPHY; M/R Staff, 6/29/59, p. 18.

ARMY EXPANDING BREAKOUT POLICY; Congress sees increased opportunities for small business with Army taking "standardized" components away from primes and buying under competitive bidding, by Erica Karr, M/R Associate Editor, 6/8/59, p. 13.

AOMC RECOMMENDS 'NO FUNDS' FOR MISSILE ABLE; Only 8 Lacrosse battalions; Prototype Pershing testing soon; Chrysler submits Jupiter for target missile, by Donald E. Perry, M/R Managing Editor, 3/30/59, p. 13.

ARMY IN THE SPACE BUSINESS (editorial), 2/2/59, p. 7.

ARPA

ARPA—A DANGEROUS COMPROMISE (editorial), 4/13/59, p. 11.

Budget

20 ICBM SQUADRONS IN BUDGET, M/R Staff, 2/2/59, p. 21.

BUDGET HOLDS $7 BILLION FOR MISSILES; $830 million for space exploration; Minuteman, Hound Dog, Polaris, Nike-Zeus programs to be accelerated in $40 billion defense budget. ARPA wants $455 million; NASA budget is $485 million, by Clarke Newlon, M/R Executive Editor, 1/26/59, p. 21.

Congress

CAN CONGRESS DEFINE 'INFLUENCE'?; by James Baar, M/R Associate Editor, 6/29/59, p. 15.

CHAIRMAN SEEKS BROAD R&D POWER; Rep. Overton Brooks feels his House group should have jurisdiction over all non-military research and development bills; sees this as step toward Department of Science, by Erica Karr, M/R Associate Editor, 6/29/59, p. 32.

U.S. SEEKS WAYS TO CLOSE TRANSLATION GAP; by James Baar, M/R Associate Editor, 5/25/59, p. 35.

DEPARTMENT OF SCIENCE: STILL 'IFFY'; Hoover-type commission recommended in Congressional hearings to decide how to centralize scattered efforts in science, by Erica Karr, M/R Associate Editor, 4/27/59, p. 30.

MAHON TO DEMAND MORE ATLASES; by James Baar, M/R Associate Editor, 4/13/59, p. 34.

WEAPON SYSTEM CONCEPT FACES TRIAL; House group is set to quiz industry and Pentagon spokesmen in lengthy hearings airing charges of monopolization and profiteering, by James Baar, M/R Associate Editor, 4/6/59, p. 15.

HOUSE GROUP URGES RELIABILITY PROGRAM; Job is to recognize that reliability must be balanced against other factors, by Betty Oswald, 4/6/59, p. 27.

U.S. SURVIVAL IN THE ATOMIC/MISSILE AGE— Two eminent lawmakers write their own widely divergent views on the Russian threat and how the U.S. should counter it. By Senator Stuart Symington and Rep. James G. Fulton, 3/30/59, p. 18.

PROCUREMENT OVERHAUL SOUGHT; Saltonstall bill, aimed at cutting lead time and Pentagon red tape, has strong support in industry and among some high DOD officials, by Erica Karr, M/R Associate Editor, 3/9/59, p. 39.

WHAT WILL BE OUTCOME OF PROBE OF STL? Congress may recommend that STL sever all financial ties to Thompson Ramo-Wooldridge, and that a limit be placed on profits and salaries of company officials, M/R staff, 2/16/59, p. 13.

HASSLE OVER SIZE OF RED LEAD; Five Congressional committees set to probe defense/space programs, by Erica Cromley, 2/2/59, p. 13.

CONGRESS SEES URGENCY IN SPACE-MISSILE GOALS, M/R Staff, 1/19/59, p. 18.

LEGISLATING FOR THE SPACE AGE (editorial), 1/19/59, p. 9.

RAND REPORT SHOULD GUIDE 86TH CONGRESS; Soviet space lead estimated at 12 to 18 months; U.S. will require 5 years to catch up, Congress told, by Paul Means, M/R Associate Editor, 1/19/59, p. 17.

CONGRESS SET FOR RENEGOTIATION FIGHT; Industry groups press for elimination of 17-year-old Act labeled costly and discriminatory, by E. E. Halmos, M/R Contributing Editor, 1/12/59, p. 13.

OPPOSITION DEVELOPING TO PRESIDENT'S COUNCIL; M/R Staff, 1/5/59, p. 14.

CONGRESS WILL KEEP EYE ON SPACE PROGRAM; New space committees being formed; industry ready to battle for new renegotiation act, by Erica Cromley, 1/5/59, p. 15.

Contracts

ARMY EXPANDING 'BREAKOUT' POLICY; Congress sees increased opportunities for small business with Army taking 'standardized' components away from primes and buying under competitive bidding, by Erica Karr, M/R Associate Editor, 6/8/59, p. 13.

A LONG LOOK AT RENEGOTIATION (editorial), 6/8/59, p. 7.

NASA PATENT RIGHTS DEBATED; Question is how much proprietary interest should space agency retain over inventions performed under contract, M/R staff, 6/1/59, p. 17.

SIX LINES FOR THE V-2; the need for less complex specifications (editorial), 3/23/59, p. 11.

NASA, DOD HAVE WIDELY DIVERGENT PATENT RIGHTS, 3/2/59, p. 14.

Financing

PITFALLS OF MISSILE BUSINESS FINANCING; Growth can be deadly. But here's where to get capital—while you still can, an M/R staff report, 5/25/59, p. 17.

Industry

THE MATTER OF THE MUNITIONS LOBBY (editorial), 6/29/59, p. 7.

WAKE UP AND LIVE; better communications by industry essential (editorial), 6/22/59, p. 7.

S. K. HOFFMAN RECEIVES M/R's GODDARD TROPHY, M/R staff, 6/1/59, p. 23.

WE EDUCATE OUR YOUTH OR RUSSIA WILL; industry urged to increase participation in scholarship awards (editorial), 4/20/59, p. 11.

ENERGETIC CHAMPION OF THE COMPONENT APPROACH, by Erica Karr, M/R Associate Editor, 4/6/59, p. 43.

HOFFMAN . . . THE POWER BEHIND ROCKETDYNE, by Erica Karr, M/R Associate Editor, 3/23/59, p. 26.

LOCKHEED EMPHASIS IS SYSTEMS MANAGEMENT; Perfecting ability in systems management is setting pace at Lockheed Missiles and Space Division, by William O. Miller, M/R Associate Editor, 2/2/59, p. 16.

Missile Business—Outlook and Trends

DEFENSE CONTRACT PROFITS, by William E. Howard, M/R Associate Editor, 5/25/59, p. 50.

SPACE MARKET, by William E. Howard, M/R Associate Editor, 5/11/59, p. 49.

D-P's GROWTH; Daystrom-Pacific to Enter Systems Work, by Richard van Osten, M/R West Coast correspondent, 4/20/59, p. 34.

ESTIMATING MISSILE EXPENDITURES; Unfortunately there are no definitive answers; but with forward planning company resources could be directed to proper business success, by Douglas S. Evered, Missile Division, North American Aviation, Inc., 2/2/59, p. 26.

NASA

NASA PATENT RIGHTS DEBATED; Question is how much proprietary interest should space agency retain over inventions performed under contract, M/R staff, 6/1/59, p. 17.

NASA SPACE FLIGHT CENTER NAMED FOR GODDARD, 5/4/59, p. 38.

NASA MAY HAVE TO ASK FOR MORE FUNDS; Eight satellite launchings, 2 space probes and 45-50 sounding rockets may require additional funds above requested $485 million, M/R staff, 4/20/59, p. 24.

NASA EXPANDS NACA PROCUREMENT SET-UP; Procurement chief says agency is decentralizing contracting and prefers doing business with established companies, by Erica Karr, 4/6/59, p. 25.

HETS PROGRAM: SPACE COOPERATION (editorial), 3/9/59, p. 7.

SPACE 'PROGRESS' BY 1969? by Paul Means, M/R Associate Editor, 2/2/59, p. 25.

NATO

NATO MISSILE BUILD-UP AT STAKE: Outcome of East-West Conference over Russia's May 27 Berlin ultimatum will affect $1 billion in U.S. missile aid, by James Baar, M/R Associate Editor, 4/27/59, p. 13.

Navy

NAVY'S REORGANIZATION TO AFFECT RESEARCH; Rear Adm. Hayward—probably next DCNO—discusses what's needed from industry, by William O. Miller, M/R Associate Editor, 3/30/59, p. 24.

Pentagon—DOD

PRIORITY RULES ARE REVISED, by Betty Oswald, M/R Associate Editor, 6/29/59, p. 19.

THE NEW DEPUTY SECRETARY OF DEFENSE (editorial), 6/15/59, p. 9.

HOW IS DOD MOVING ON RELIABILITY? Some observers say it is in all directions but Air Force has come up with a new reliability monitoring system which should give better standards, by Betty Oswald, M/R Associate Editor, 6/1/59, p. 21.

PROPOSED—A UNIFIED STRATEGIC COMMAND (editorial), 6/1/59, p. 9.

THE NEXT DEPUTY DEFENSE SECRETARY (editorial), 5/18/59, p. 9.

CONCURRENCY—PRIME NEED IN PENTAGON (editorial), 5/11/59, p. 7.

WEAPON SYSTEM CONCEPT FACES TRIAL; House Group is set to quiz industry and Pentagon spokesmen in lengthy hearings airing charges of monopolization and profiteering, by James Baar, M/R Associate Editor, 4/6/59, p. 15.

QUARLES BEST TO REPLACE McELROY (editorial), 3/30/59, p. 7.

SOME VIEWS OF DOD RESEARCH CHIEF YORK; Pentagon's first R&E director gives priority to weapon system or basis of importance of its mission and encourages industry to do more research on its own, by Paul Means, M/R Associate Editor, 3/23/59, p. 21.

PROCUREMENT OVERHAUL SOUGHT; Saltonstall bill, aimed at cutting lead time and Pentagon red tape, has strong support in industry and among some high DOD officials, by Erica Karr, M/R Associate Editor, 3/9/59, p. 39.

THE NEW LINE-UP IN SPACE (editorial), 2/23/59, p. 9.

DOD CHIEFS BACK BUDGET; REGRET CUTS; Sentiment heavy in Congress for restoring many budgetary cuts, M/R staff, 2/9/59, p. 21.

NEITHER LIFE NOR DEFENSE ENDS AT 40 (editorial), 1/26/59, p. 11.

THE CASE OF DR. YORK AND MR. JOHNSON (editorial), 1/12/59, p. 57.

IDA'S 'BRAIN FACTORY' GUIDES WEAPON CHOICES; Five universities work with Pentagon to provide staff for secret projects, by E. E. Halmos, Jr., M/R Contributing Editor; 1/5/59, p. 20.

Procurement

MEDARIS GIVES HIS BASIC PROCUREMENT PHILOSOPHY, M/R Staff, 6/29/59, p. 18.

NASA EXPANDS NACA PROCUREMENT SET-UP; Procurement chief says agency is decentralizing contracting and prefers doing business with established companies, by Erica Karr, M/R Associate Editor, 4/6/59, p. 25.

PROCUREMENT OVERHAUL SOUGHT; Saltonstall bill, aimed at cutting lead time and Pentagon red tape, has strong support in industry and among some high DOD officials, by Erica Karr, 3/9/59, p. 39.

Renegotiation

A LONG LOOK AT RENEGOTIATION (editorial), 6/8/59, p. 7.

CONGRESS SET FOR RENEGOTIATION FIGHT; Industry groups press for elimination of 17-year-old Act labeled costly and discriminatory, by E. E. Halmos, M/R Contributing Editor, 1/12/59, p. 13.

Research

AF PUSHES RESEARCH ON DETONATION PROBLEM, by James Baar, M/R Associate Editor, 6/15/59, p. 23.

Russia

RED THREAT FROM ANTARTICA; U.S. and other nations are worried about Russian bases build-up and submarine missile launching potential, by James Baar, M/R Associate Editor, 6/1/59, p. 15.

SOVIET AFFAIRS; USSR plans scientific information center, by Dr. Albert Parry, M/R Contributing Editor, 6/1/59, p. 47.

SOVIET AFFAIRS; Soviet press evaluates U.S. missilery, 4/20/59, p. 48.

WHEN RUSSIA PUTS MEN IN SPACE (editorial), 4/6/59, p. 6.

SOVIET AFFAIRS; Russians claim space lead, by Dr. Albert Parry, M/R Contributing Editor, 1/12/59, p. 38.

WORLD MUST SOLVE BRAND NEW PROBLEM OF MOON RIGHTS; Authorities seeking answers find few precedents to work with and most consider U.N. control the most feasible, by Donald Cox, M/R Contributing Editor, 3/23/59, p. 24.

Taxes

WITH GOVERNMENT RECONSIDERING FAST TAX WRITE-OFFS, WILL 1959 BE 'BOOST' OR 'BUST' YEAR FOR SPACE RESEARCH? by William E. Howard, M/R Associate Editor, 4/20/59, p. 19.

Weapon Systems & WS Management

AF SEES IMPROVED SYSTEM MANAGEMENT; Weapon System Project Offices are reportedly getting the job done more efficiently although there's still the problem of just when production people should take over, by Betty Oswald, M/R Associate Editor, 6/29/59, p. 35.

HOW DO WE MAKE WEAPON SYSTEM INTEGRATION WORK? AF has established Project Offices with broad authority for overall management of all phases, by Betty Oswald, 6/15/59, p. 24.

STRATEGIC READY RESERVE STUDIED; Contractual personnel would maintain and operate complex weapon systems even in tactical use under proposed plans, by Donald E. Perry, M/R Managing Editor, 5/4/59, p. 13.

'FATHER' OF DYNA-SOAR AWAITS AF DECISION, by Erica Karr, M/R Associate Editor, 5/4/59, p. 29.

SMALL ALBM MAY GO ON F-105; Republic's Mach 2 fighter may be built in Europe under NATO nations' share plan, by Clarke Newlon, M/R Executive Editor, 4/27/59, p. 14.

RELIABILITY IS OUR MOST IMPORTANT HEADACHE (editorial), 2/16/59, p. 7.

MATERIALS

Ceramics

MISSILE NEEDS POSE CHALLENGES FOR CERAMICS; Industry expects demand within decade for materials that will take temperatures up to 4000°F in missiles, by R. T. Inglis and D. L. Krout, Jr., 3/9/59, p. 34.

Connection (welding, etc.)

WELDING REDSTONE; Extreme care exercised at Reynolds plant precludes faulty welds, by M/R Staff, 6/8/59, p. 29.

Environmental Effects

SPACECRAFT MATERIALS PROBED BY SYMPOSIUM; by Frank McGuire, M/R Associate Editor, 5/25/59, p. 56.

IR ANALYZERS MONITOR GIANT WIND TUNNEL; by M/R Staff, 5/11/59, p. 41.

SOVIET AUTHOR WRITES ON THERMAL MATERIALS; by M/R Staff, 3/2/59, p. 29.

Explosive Forming

INDUSTRY PUTTING INCREASED EMPHASIS ON HEF PROCESSES; But the physical and metallurgical problems still remain largely unanswered with techniques being debated, by Frank McGuire, M/R Associate Editor, 5/6/59, p. 28.

Metals

BERYLLIUM STRUCTURE MADE; by M/R Staff, 6/8/59, p. 41.

NAA'S NOVEL APPROACH TO STAINLESS STEEL HONEYCOMB PANELS; Company sees "new era" in vehicle construction; process includes original heat-treating cycle, by Frank McGuire, M/R Associate Editor, 5/11/59, p. 23.

LOW COST BRAZED STEEL HONEYCOMB STRUCTURES; Martin's new hardened alloy solves problem of uneven filleting in brazing and allows opening of tolerances, by Clarence A. Boyce, Jr., Martin Co., 5/4/59, p. 33.

METALS CONGRESS DISCUSSES PROBLEM SOLUTIONS; Great strides reported in such fields as increasing metal strength and test methods, 3/23/59, p. 29.

'BREAKTHROUGH' IN TUNGSTEN FABRICATION; Fansteel research opens new applications for missile electronics, propulsion and structures, by Donald E. Perry, M/R Managing Editor, 3/23/59, p. 22.

Outlook

WHAT'S COMING IN MATERIALS RESEARCH? A leader in the field says costly and less glamorous production research has been neglected but novel techniques are being developed for fabrication and screening of new materials, by Arthur R. Lytle, Union Carbide, 4/6/59, p. 30.

HERE'S 1959 OUTLOOK FOR MISSILE MATERIALS; Metals will remain the mainstay, but competition from plastics will mean more teaming with ceramics, by Alfred J. Zaehringer, Associate Editor, M/R, 1/26/59, p. 24.

Plastics

SINGER'S CAST EPOXY RESIN MIRRORS REQUIRE NO COSTLY HAND WORK; Polishing and finishing eliminated in plastic replica process. Mirrors withstand 20,000g in shock tests, by M/R Staff, 3/2/59, p. 16.

MISSILES, SATELLITES & RESEARCH VEHICLES

Foreign Astronautics

REPORT FROM WEST GERMANY; Reds have "hundreds" of 700-mile missiles facing Western Europe; Germany would make Hawks under license; French atomic complaints, by Clarke Newlon, M/R Executive Editor, 6/29/59, p. 45.

BRITISH ASTRONAUTICS; More successful Seaslug trials; Rolls-Royce building Rocketdyne motors; Thunderbird comes into service with Army, by G.V.E. Thompson, M/R British Correspondent, 6/29/59, p. 28.

ON DISPLAY AT PARIS AIR SHOW; The Continent's biggest Space Age exhibition, by Jean-Marie Riche, M/R French Correspondent, 6/29/59, p. 24.

BRITISH ASTRONAUTICS; Government evasive on how much will be spent for space flight program; planetary probes and manned flight ruled out already, by G.V.E. Thompson, M/R British Correspondent, 6/8/59, p. 30.

SWISS FIRM TURNS OUT MOST MISSILES IN ITALY; Contraves AG developing into big supplier with its RSD-58 and RSC-57 missiles, by Anthony Vandyk, M/R Geneva Correspondent, 6/1/59, p. 22.

FRENCH ASTRONAUTICS; Air-to-Air and Ground-to-Air Missiles, M/R Paris Correspondent, 5/11/59, p. 19.

BRITISH ASTRONAUTICS; Progress on 24-channel time multiplex system; No decision yet on a British spaceflight programme; Blue Steel readied for test at Woomera, by G. V. E. Thompson, M/R British Correspondent, 5/11/59, p. 17.

FRENCH ASTRONAUTICS; S.E.P.R. test facilities are believed to be best on Continent; firm builds and tests both solid and liquid-fueled engines, by Jean-Marie Riche, M/R French Correspondent, 4/13/59, p. 28.

U.S. BUYING SS 10-11 FOR FORCES IN EUROPE, by Frank G. McGuire, M/R Associate Editor, 3/2/59, p. 32.

BLACK KNIGHT ENGINE DESCRIBED; by Anthony Vandyk, M/R Geneva Correspondent, 2/2/59, p. 24.

SEDOV COMPARES WEIGHTS OF U.S./SOVIET ROCKETS; M/R Staff, 2/2/59, p. 19.

EUROPEAN GROUP STUDIES BUILDING U.S. MISSILES; M/R Staff, 2/2/59, p. 21.

Research Vehicles

AEROJET'S NEW SOUNDING ROCKETS; Company is already taking orders for Astrobee series reportedly costing less than Aerobee but offering improved ease of handling, thrust alignment and attitude accuracy, by Frank G. McGuire, M/R Assistant Editor, 6/15/59, p. 25.

SCOUTING THE FRINGE OF SPACE; X-15 manned research vehicle rehearses for first flight, by Erica Karr, M/R Associate Editor, 6/1/59, p. 31.

NASA REPORTS SUCCESSFUL 5-STAGE SOUNDING ROCKET, M/R staff, 4/13/59, p. 38.

X-15 DROP SOON; Guidance to be tested in early phase, 2/16/59, p. 26.

Satellites

VANGUARD ORBIT TRY FAILS AS REGULATOR BREAKS DOWN, M/R staff, 6/29/59, p. 33.

NASA SPACE LAB PLANS OUTLINED; ARS meeting also hears debate on the long-term value of Project Mercury holding facility' and reports on ramjet, ion engine and APU developments, by Frank G. McGuire, M/R Associate Editor, 6/22/59, p. 24.

U.S. MAY SEEK PACT TO SILENCE OUTWORN SATELLITES; Delegation at Geneva meeting will also propose radio frequencies to be reserved for space use only, by Paul Means, M/R Associate Editor, 6/1/59, p. 24.

ABMA RECEIVES FIRST OF SATURN ENGINES; Jupiter test stand being modified to accommodate cluster of Rocketdyne H-1 liquid engines, M/R staff, 5/25/59, p. 36.

ADAM MAKES COMEBACK IN MERCURY, by Paul Means, M/R Associate Editor, 5/4/59, p. 49.

DISCOVERER, YES; VANGUARD, NO! Polar satellite capsule is believed to have reentered; magnetometer try invalidated by second stage trouble, 4/20/59, p. 22.

EXPLORER V WILL CARRY HIGHLY COMPLEX PAYLOAD; by Paul Means, M/R Associate Editor, 3/27/59, p. 20.

DISCOVERER I ORBIT DUBIOUS; Intermittent signals may be caused by satellite's tumbling or solar heat reviving cold batteries, M/R staff, 3/9/59, p. 20.

PIONEER DEVIATES IN TRAJECTORY; But first stage Jupiter fired perfectly with less than one second lift-off delay by ABMA team, by Paul Means, M/R Associate Editor, 3/9/59, p. 20.

WEATHER SATELLITE WILL HAVE THREE CAMERAS; Later meteorolgical experiments will be responsibility of Weather Bureau Section, by Frank G. McGuire, M/R Associate Editor, 3/2/59, p. 17.

REDS SAY LUNIK MADE 'COMET,' by Frank G. McGuire, M/R Associate Editor, 2/23/59, p. 30.

SCOUT COULD ORBIT 150 LBS, M/R staff, 2/16/59, p. 13.

U.S. RESEARCH AIMS AT SPACE LAB, by Clarke Newlon, M/R Executive Editor, 2/2/59, p. 12.

RE-ENTRY NAVIGATION: 'BREAKTHROUGH' IS NOT REQUIRED, by Raymond M. Nolan, M/R Associate Editor, 1/26/59, p. 29.

LOCKHEED SPACE STATION INTERESTING U.S. AGENCIES; Satellite Laboratory could be in operation in 10 years; Cost estimate put at $2.163 billion, by Norman L. Baker, M/R Associate Editor, 1/19/59, p. 19.

STANDARD NAVIGATION AIDS COULD GUIDE SPACE TRAVEL; M/R staff, 1/19/59, p. 27.

LUNIK BECOMES SOLAR SYSTEM'S Tenth "Planet"; Indications are Russians may have hoped to hit moon; exploit demonstrates know-how in velocity, guidance, by Norman L. Baker, M/R Associate Editor, 1/12/59, p. 21.

USSR LUNAR PROBES WILL ORBIT CLOSE TO SURFACE. By Lt. Cmdr. John A. Fahey, U.S. Naval Intelligence School, 1/12/59, p. 22.

MISSILE SUPPORT

Electronics

ELECTRONIC OUTPUT TO DOUBLE BY 1965; What's the future for electronics in MSE? by William E. Howard, M/R Associate Editor, 5/25/59, p. 25.

General

THE GOLDEN FIELD OF MISSILE SUPPORT (Editorial), by Clarke Newlon, M/R Executive Editor, 5/4/59, p. 6.

ARS MEETING STRESSES GROUND SUPPORT EQUIPMENT; Pre-launch problems, data handling and missile performance comes up in technical papers delivered by specialists, by William O. Miller, M/R Associate Editor, 3/30/59, p. 16.

Launching Facilities

HOW TO HANDLE 24-MEG THRUST; Special logistics will be needed for 1.5 million pounds-plus boosters, by Chauncey J. Hamlin Jr., North American Aviation, 6/29/59, p. 16.

FBM SUB PROVIDES NEW MARKET; With 45 missile-launching boats possible, lion's share of some $4.5 billion should go for support equipment, by Donald E. Perry, M/R Managing Editor, 6/8/59, p. 31.

MINUTEMAN RAIL CONCEPT PUSHED; 200 missile trains appear possible which should open up a whole new field of missile support equipment running into multi-million dollar program, by William E. Howard, M/R Associate Editor, 6/1/59, p. 19.

U.S. SEEKS MANUS LAUNCH SITE; ARPA has engineering plan to spend millions on tying island into PMR; NASA may help in development of site when selected, by William E. Howard, M/R Associate Editor, 5/18/59, p. 21.

BILLIONS FOR ICBM LAUNCHING FACILITIES; Air Force wants $343 million in FY '60 alone to harden Atlas and Titan bases . . . advent of Minuteman will swell outlay, by William E. Howard, M/R Associate Editor, 5/11/59, p. 13.

CAPE OPERATING AT ONE-FIFTH CAPACITY, by M/R Staff, 5/4/59, p. 36.

PMR INVESTMENT TO REACH $250 MILLION IN 1962; Extra $75 million probably will be funded in next two years for base construction, by Robert Mount, 4/13/59, p. 36.

A HARD LOOK AT SPACE LOGISTICS; AF-sponsored conference told it may be 5-10 years before man can be kept alive in space; planners banking on better component reliability, by William O. Miller, M/R Associate Editor, 4/6/59, p. 17.

ATLAS BASES TO BE HARDENED; Titan and Atlas will both be continued, Pentagon tells Congress, but Bomarc sites are cut sharply, by James Baar, M/R Associate Editor, 3/30/59, p. 15.

WORLD RAPIDLY ADDING MORE MISSILE RANGES; United States is negotiating in hopes of cooperation in man-in-space plans. Existing ranges vary from relatively small facilities to those extending thousands of miles. Small nations are participating at a fast-growing rate, by William O. Miller, M/R Associate Editor, 3/9/59, p. 15.

Production Facilities

SPIN FORGE FORMS STEEL ONE INCH THICK, by M/R Staff, 3/23/59, p. 31.

NEW ROBOT IS BIG STEP IN NUMERICAL CONTROL; Automatically programmed tool developed at MIT translates jargon and guides cutting, by James J. Haggerty, Jr., M/R Contributing Editor, 3/9/59, p. 33.

THOR IRBM PRODUCTION; by Fred S. Hunter, M/R Associate Editor, 2/16/59, p. 15.

JUPITER IRBM PRODUCTION; by Alfred J. Zaehringer, M/R Associate Editor, 2/16/59, p. 18.

Research Facilities

HOW BIG A MISSILE SUPPORT FILE? AF list will start with some 2500 data sheets but opinions differ on how much longer it will get, by William E. Howard, M/R Associate Editor, 6/22/59, p. 13.

AF CATALOGUING SUPPORT ITEMS; Massive volume due July 1 should save millions in wasteful development of redundant equipment and should standardize handling and checking-out gear, by William E. Howard, M/R Associate Editor, 6/15/59, p. 21.

Safety

AF TEAM SEEKS SAFER MISSILE FLIGHTS; GMB group is handicapped by sparse data but hopes to develop a central report procedure, by Richard van Osten, M/R Associate Editor, 4/27/59, p. 28.

WHAT WILL BE NEEDED IN MSE—WHEN MAN ENTERS THE MISSILE, by Hal Gettings, M/R Associate Editor, 4/20/59, p. 20.

Target Facilities

FOUR COMPANIES PRODUCING VERSATILE DRONES; Bendix, Republic and Marquardt joined forces in designing ground-launched Hilo, providing a bomber-like radar image. Bell worked with Bendix in developing Penny, air-launched to perform at high altitude and supersonic speeds, by Frank G. McGuire, M/R Associate Editor, 2/23/59, p. 21.

Test and Checkout

ATLAS PARTS TEST STAND PRODUCED BY ROCKETDYNE; by M/R Staff, 6/8/59, p. 32.

A MAMMOTH GANTRY FOR SATURN; Structure will cost $9.5 million with test tower, opening new dimension in missile support equipment, by M/R Staff, 6/8/59, p. 33.

VIBRATION TESTING OF NEW MISSILES SAVES MONEY AND TIME; Trend is toward more accurate reproduction of effects of dynamic forces, using such equipment as Ling's spectral density analyzer system, by Cameron G. Pierce, 4/27/59, p. 17.

VANGUARD TESTING: BACKBONE OF PRESENT BALLISTIC MISSILE ART; Checkout 'primer' developed by Martin gives pattern for industry to follow, by William E. Howard, M/R Associate Editor, 4/6/59, p. 20.

TITAN'S TESTING TIME MAY BE ONE HALF ATLAS'; SAC personnel to join Martin's streamlined test division in September; static firings may be eliminated at Cape, by Donald E. Perry, M/R Managing Editor, 3/16/59, p. 22.

COOK LABS DO MASS COMPONENTS TESTING; Inland testing engineers screen up to 100,000 parts simultaneously without damaging those that are acceptable, by M/R Staff, 2/23/59, p. 24.

BOMARC ENGINES ARE TESTED AT MARQUARDT LAB; Huge facility stores fifty tons of air for supersonic testing at altitudes near 200,000 feet, by Raymond M. Nolan, M/R Associate Editor, 1/12/59, p. 15.

Test Ranges

A CRISIS IN RANGE INSTRUMENTATION; AFMTC commander says more funds and effort must be expended to cure the rapidly widening time bottleneck, by Maj. Gen. Donald N. Yates, 6/29/59, p. 20.

Tracking

NEW AMPLIFIERS EXTEND MISSILE TRACKING RANGE; by M/R staff, 3/23/59, p. 41.

3000-MILE RADAR MAY BE ON TRACKING SHIP; by Peer Fossen, M/R Associate Editor, 2/2/59, p. 32.

Transportation

GOODYEAR'S APPROACH FOR ATLAS MSE; by M/R Staff, 4/20/59, p. 23.

NYC TESTS MISSILE TRANSPORT; by Frank G. McGuire, M/R Associate Editor, 2/2/59, p. 19.

PROPULSION

Controls

THROTTLEABLE ENGINE PROLONGS AIRCRAFT LIFE; Rocketdyne's AR series with up to 6000-lb thrust is ready for use although Navy has cancelled program, by Frank G. McGuire, M/R Associate Editor, 4/27/59, p. 23.

COMPLICATION FOR SOLIDS: THRUST-DIRECTION CONTROL; Ballistic missiles will require thrust vector control, thrust termination, thrust modulation, by Norman L. Baker, 2/9/59, p. 23.

Cryogenics

PROPULSION ENGINEERING; New plant turns out 'purest hydrogen ever made', by M/R staff, 6/8/59, p. 45.

FLUORINE ENGINES MAY ARRIVE WITHIN FIVE YEARS; Dramatic increase in rocket capability will come when compatible materials are developed. Fuel supply considered more than adequate, by Paul Means, M/R Associate Editor, 5/11/59, p. 42.

VACUUM JACKETING CUTS FUEL LOSSES; CEC reports its jacketed lines reduce boil-off by half, compared to those insulated with other materials, M/R staff correspondent, 4/6/59, p. 22.

Hybrids

PROPULSION ENGINEERING; Advantages of hybrid nuclear-chemical rocket engines, M/R staff, 5/18/59, p. 52.

Liquid

PROPULSION ENGINEERING; Ammonium nitrate as oxidizer, M/R Staff, 4/27/59, p. 49.

BRITISH ASTRONAUTICS: British firm starts manufacture of hightest hydrogen peroxide, by G. V. E. Thompson and K. W. Gatland, M/R Contributing Editors, 4/6/59, p. 19.

PROPULSION ENGINEERING; Boron fuels, M/R Staff, 3/16/59, p. 40.

ARMOUR ENTERS EMPIRICAL ROCKET APPLICATIONS, M/R staff, 3/2/59, p. 18.

FUELS VAPORIZATION STUDY CONTRACT AWARDED BY NSF, M/R staff, 2/23/59, p. 56.

PROPULSION ENGINEERING; Pre-packaged liquid propellant announced by Navy, by Alfred J. Zaerhringer, M/R Associate Editor, 2/9/59, p. 106.

1-1.5 MEG ENGINE MAY BE OPERATIONAL IN SIX YEARS, M/R staff, 2/2/59, p. 20.

Nuclear

PROPULSION ENGINEERING; Vary thrust for optimum nuclear rocket performance, M/R Staff, 6/1/59, p. 45.

AEC IS RECOVERING VALUABLE CERIUM 144, M/R staff, 4/13/59, p. 38.

PROPULSION ENGINEERING; Aerojet's head questions nuclear rocket's practicality, M/R staff, 4/6/59, p. 47.

THE NEGLECTED ATOMIC PROPULSION PROGRAM (editorial), 3/2/59, p. 7.

GE SCIENTISTS DESCRIBE NUCLEAR POWER PACKAGE, M/R staff, 1/5/59, p. 30.

Outlook

INDUSTRY TELLS CONGRESS: DO MORE BASIC RESEARCH NOW, by William E. Howard, M/R Associate Editor, 3/30/59, p. 20.

CHEMICAL INDUSTRY EXPANDS FOR ASTRONAUTICS, by Alfred J. Zaehringer, M/R Contributing Editor, 2/2/59, p. 28.

Plasma

PLASMA ENGINE DELIVERS NEARLY 2 LBS; M/R staff, 6/8/59, p. 34.

Solids

PROPULSION ENGINEERING; Basic studies on plastics will give propulsion engineers more solid propellant data, M/R Staff, 6/22/59, p. 45.

COMPLICATION FOR SOLIDS: THRUST-DIRECTION CONTROL; Ballistic missiles will require thrust vector control, thrust termination, thrust modulation, by Norman L. Baker, M/R Associate Editor, 2/9/59, p. 23.

SPACE MEDICINE

Animal Experiments

PIONEERING MONKEYS AND MICE; Two monkeys come back strong from Jupiter flight, though one dies later; Discoverer III tests will be U.S.'s most elaborate effort, by James Baar, 6/8/59, p. 28.

SPECIAL PROBLEMS OF THE MONKEY-IN-SPACE, by Dr. Earl T. Carter, Ohio State University, 5/11/59, p. 30.

Human Engineering

ADAPTING MAN TO HIS LIFE IN SPACE, by James Baar, M/R Associate Editor, 6/29/59, p. 22.

SPACE FEEDING: BIG $$ MARKET; Air Force contracting with industries on four lines of space food with bulk of work being handled through Quartermaster Food and Container Institute, by James Baar, M/R Associate Editor, 6/15/59, p. 28.

SPACE MEDICINE PROBLEMS PROBED BY AMA, by Frank G. McGuire, M/R Associate Editor, 5/11/59, p. 22.

CONVAIR INVESTIGATES ENVIRONMENTAL TOLERANCES, M/R staff, 2/9/59, p. 63.

. . . Index

Space Capsules

AN EXCLUSIVE INTERVIEW WITH THE AF SPACE MEDICINE CHIEF; Dr. Hubertus Strughold looks beyond Project Mercury to time when space flights may last months, 3/30/59, p. 22.

McDONNELL GETS MERCURY AWARD; by Clarke Newlon, M/R Executive Editor, 1/19/59, p. 18.

STRUCTURES

Astrodynamics

DRAG BRAKE PROPOSED FOR M-I-S, M/R Staff, 6/22/59, p. 18.

Components

THE CASE FOR COMPONENTS RESEARCH, by Charles D. LaFond, M/R Associate Editor, 4/6/59, p. 22.

Design

NOTCH SENSITIVITY WALL WILL CRACK, M/R Staff, 6/22/59, p. 15.

DETAILS OF ATLAS CONSTRUCTION DISCLOSED, M/R Staff, 6/1/59, p. 26.

Nose Cones

BIRTH OF A TITAN NOSE CONE, M/R Staff, 5/11/59, p. 32.

SPRAYING TECHNIQUE MAY CUT RADOME COST, by Richard Van Osten, M/R Associate Editor, 3/16/59, p. 37.

THE CASE FOR ABLATION, by Henry G. Lew, Sinclair M. Scala and George W. Sutton, 6/8/59, p. 19.

THE CASE FOR HEAT SINK, by Dr. J. D. Stewart, 6/8/59, p. 16.

Test

WEAPONS TESTING BOOMS AT AF'S ARNOLD CENTER, M/R Staff, 3/9/59, p. 31.

ARGMA'S PLASMA JET TEST FACILITY IN OPERATION; Prototype model for aerodynamic heating tests reaches 50,000° fusing argon gas with 13,000 fps flow rate, by M/R Staff, 3/23/59, p. 39.

THE DEATH OF A MISSILE; One of 40,000 parts fails and a 75-foot bird of space (Atlas) blows up—pictures by Cornell Capa, story by Erica Karr, M/R Associate Editor, 5/4/59, p. 17.

VIBRATION TESTING OF NEW MISSILES SAVES MONEY AND TIME; Trend is toward more accurate reproduction of effects of dynamic forces, using such equipment as Ling's spectral density analyzer system, by Cameron G. Pierce, 4/27/59, p. 17.

VANGUARD TESTING: BACKBONE OF PRESENT BALLISTIC MISSILE ART; Checkout 'primer' developed by Martin gives pattern for industry to follow, by William E. Howard, M/R Associate Editor, 4/6/59, p. 20.

TITAN'S TESTING TIME MAY BE ONE HALF ATLAS'; SAC personnel to join Martin's streamlined test division in September; static firings may be eliminated at Cape, by Donald E. Perry, M/R Managing Editor, 3/16/59, p. 22.

COOK LABS DO MASS COMPONENTS TESTING; Inland testing engineers screen up to 100,000 parts simultaneously without damaging those that are acceptable, by M/R Staff, 2/23/59, p. 24.

BOMARC ENGINES ARE TESTED AT MARQUARDT LAB; Huge facility stores fifty tons of air for supersonic testing at altitudes near 200,000 feet, by Raymond M. Nolan, M/R Associate Editor, 1/12/59, p. 15.

missile business . . .

By WILLIAM E. HOWARD

Multi-million dollar savings . . .

are envisioned through proposed electronic data processing of DOD's worldwide logistics operation. High speed equipment would be utilized to keep up-to-the-minute records of the thousands of parts and design changes in missile/aircraft and other weapon systems. AIA reports the plan will be submitted to DOD next month. It was devised by a Military/Industry Logistics Data Development Unit (MILDDU) after a 10-month study determined that a single data exchange system could be designed using a standardized punch card record length as the base for development.

Meantime, just such a "push-button" . . .

delivery system has been developed at Warner Robins Air Materiel Area, Robins AFB, Ga., to support *Mace* installations. **Goodyear Aircraft,** which recently received a $302,000 *Mace* warehousing order from Warner Robins and has the complete support contract for the **Martin**-built missile as well as its guidance system, says the new electronic logistic system is called MAST (missile automatic supply technique). Designed to eliminate slow-moving paperwork, MAST absorbs data on component usage over a global network in seconds. The data is code-punched at supply depots and transmitted to Warner Robins.

Inventories are instantly computed . . .

at headquarters and orders issued to warehouse points or manufacturers to ship required parts and supplies. The concept amounts to a supply sergeant's dream come true. No forms. Just punch a button and wait for the stuff to arrive on the next plane.

Goodyear says the MAST system has been thoroughly tested and presently is being put into operation to control *Mace* logistics primarily at launching and supply depots of the Tactical Air Command in Europe. Squadrons of the 800-mile range *Mace* are now replacing the shorter range *Matador.*

An automatic production and inventory . . .

control system is helping keep kinks out of operations at the **Rocketdyne Division of North American Aviation.** The company says the newly-installed Mechanized Production Control (MPC) system gives management a daily report on all rocket engine manufacturing activities. Moreover, it "immediately calls out corrective action for all behind-schedule parts or components."

Rocketdyne Factory Manager Ross Clark . . .

says with MPC company business is administered at considerably less cost and with greater accuracy. Here's the way it works: employing automatic tabulating machines, MPC established schedules on all production activities, starting with engineering drawings. Then, automatically, engineers are notified when to release the drawings, the purchase department is notified when to buy parts or material, and production departments are informed when they will receive the parts and given a completion date. All activities leading to engine fabrication are pre-scheduled and all components and parts are detailed on a master list.

"Move cards" keep track of progress on parts and components as they move through production departments. Information from these cards is fed into electronic accounting machines, which then compile reports listing the production status of all parts.

Benefits of the system, says Clark . . .

include reduction of production lead time, reduction of work that is behind schedule and the maintaining of accurate up-to-the-minute inventories. He says MPC is, indeed, one of the company's "most important new programs."

Missiles and Rockets Editorial Index

Readers are invited to save the following six-month index covering M/R issues of July 6, 1959 through Dec. 28, 1959. This index is a reference guide to major news and technical articles published in M/R during the last half of the year.

ASTRIONICS

Antennas

ANTENNAS: THERE'S A LIMIT IN SIZE; What's needed is the ability to manufacture dishes and maintain them in an exposed environment to the close tolerances required, by Hal Gettings, M/R Associate Editor, 8/10/59, p. 18.

Automatic Checkout

UNIVERSAL CHECKOUT CENTER IS URGED TO MATCH WEAPON ADVANCES; Packard Bell, with experience in Polaris, Thor and Falcon programs, believes the concept will reduce inventories and personnel and enhance portability, 10/5/59, p. 23.

A CLOSE-UP OF TWO AUTOMATIC CHECKOUT SYSTEMS; Curtiss-Wright's DEMON and Nortronics' NORSCAN are fully transistorized, modularly constructed and completely self-checking, by Charles D. LaFond, M/R Associate Editor, 7/6/59, p. 33.

Communications

DEVICES COULD HANDLE 300 MILLION WORDS/SEC; 12/7/59, p. 26.

EXPLORER VI MAY SOLVE PUZZLE OF REPETITIOUS RADIO SIGNALS; 11/9/59, p. 24.

PROMISE OF NEW 'DECISION THRESHOLD COMPUTER'; Simple device performs well in NATO scatter stations and is expected to find application in telemetry, especially over long distances, by Charles D. LaFond, M/R Associate Editor, 8/24/59, p. 18.

Components

EYELETS VS. PLATED-THRU HOLES IN PRINTED CIRCUITRY; A report on a comprehensive test in which all located failures were in eyeletted phenolic boards, by Barnard C. Alzua, Jr., 7/27/59, p. 37.

Control Systems

RCA SYSTEM DESIGNED TO RELIEVE INTERFERENCE TROUBLES; 8/31/59, p. 32.

PROMISE OF A NEW 'DECISION THRESHOLD COMPUTER'; Simple device performs well in NATO scatter stations and is expected to find application in telemetry, especially over long distances, by Charles D. LaFond, M/R Associate Editor, 8/24/59, p. 18.

Data Processing

DEVICES COULD HANDLE 300 MILLION WORDS/SEC; 12/7/59, p. 26.

SAGE GUIDES INTERCEPTOR MISSILES; An exclusive account of a computer's role in meeting air attack, by Lawrence R. Jeffery, 9/21/59, p. 56.

Data Recording

TINY RECORDER SURVIVES MISSILE FLIGHT, DUNKING; Ampex unit performs perfectly when retrieved after flight in AF missile nose cone and nine days in the Atlantic, 11/30/59, p. 31.

DATA HANDLING SYSTEM MAY BOOST USE OF DIGITAL TAPE; This 100-lb. Datalab recorder with total capacity of 2.4 billion bits is touted as having great potential for space exploration, 10/5/59, p. 19.

VIDEOTAPE SUCCESSFULLY USED TO RECORD RADAR SIGNALS; Army's Signal Missile Support Agency finds great advantage in immediate playback capability for trajectory evaluation, 9/28/59, p. 24.

MAGNETIC TAPE RECORDING SALES BOOMING; This year should see 700,000 units sold but most promising future applications will be in astronautics for photo-reconnaissance, by Robinette E. McCabe, 8/3/59, p. 34.

Electronic Cooling

IR INDUSTRY IS SOLVING ITS COOLING PROBLEM; IR-Detector cells are behind the state-of-the-art of cells, but R&D is closing the gap with better hardware and advanced methods, by Charles D. LaFond, M/R Associate Editor, 11/2/59, p. 16.

HUGHES RESEARCH REVEALS ADVANCES IN INFRARED DETECTION; Shielding technique doubles IR search and tracking range; cooling methods treble detectivity of IR cells, 9/28/59, p. 19.

NEW TECHNIQUES AID ELECTRONICS COOLING; Basic methods of heat dissipation in components are the same but the applications can vary. Here are principal methods, by Hal Gettings and Charles D. LaFond, M/R Associate Editors, 8/3/59, p. 38.

ELECTRONICS COOLING — MULTIMILLION-DOLLAR STEPCHILD; The demand for cooling units is growing. An M/R staff survey shows how the challenge is being met. First of two stories, by Hal Gettings and Charles D. LaFond, M/R Associate Editors, 7/27/59, p. 34.

Energy Conversion

Isp MAY BE UPPED BY WIRE EXPLOSIONS; Company believes this propulsion can provide more power than most proposed electrical systems offer; other uses seen in communication, attitude correction, 12/28/59, p. 20.

ENERGY CONVERSION GROWS IN IMPORTANCE; New stress on space and potential commercial uses gives impetus to search for more and better ways to convert energy directly to usable electricity, by Hal Gettings, M/R Associate Editor, 12/7/59, p. 22.

SOLAR ENERGY DEVICE CAN PRODUCE AC OR DC POWER; 12/7/59, p. 39.

WORLD'S BIGGEST SOLAR ENERGY CONVERTER USED TO OPEN HOFFMAN SEMICONDUCTOR PLANT; 11/30/59, p. 25.

MISSILE APU MAKER DENIES BATTERIES ARE ALWAYS BEST; Sundstrand Co.'s rebuttal to report by Frank Cook Co. charges among other things that Cook report "compares apples and oranges," 11/2/59, p. 18.

BATTERY MAKER'S REPORT CLOBBERS HOT-GAS APU's; by Charles D. LaFond, M/R Associate Editor, 8/31/59, p. 33.

BATTERIES RETAIN MAJOR MISSILE POWER ROLE; Survey shows electrochemical batteries are desirable auxiliary power sources for many uses; sales expected to grow ten-fold, by Charles D. LaFond, M/R Associate Editor, 8/24/59, p. 15.

APU'S—AN OFT-NEGLECTED $25 MILLION BUSINESS; Report shows that gas-turbines are first choice for missile auxiliary power units, with batteries close behind; exotic sources still in the future; crash programs make complications, by Hal Gettings, M/R Associate Editor, 8/17/59, p. 31.

PUSHING THE SEARCH FOR SPACE VEHICLE POWER; Government and industry strive to find sources of electrical power that will permit prolonged space missions, by Paul Means, M/R Associate Editor, 7/27/59, p. 22.

Fuzing and Arming

THE REMARKABLE RELIABILITY OF FUZING AND ARMING; An outline of the accomplishments and tricky requirements in a secrecy-shrouded and largely government-controlled field, by Hal Gettings, M/R Associate Editor, 7/6/59, p. 30.

Guidance

NERVE CELL RESEARCH URGED FOR 'DECISION-MAKING' GUIDANCE; Armed Forces Chemical Association also hears of need for work in dielectric behavior in space, by John Judge, M/R Associate Editor, 9/21/59, p. 85.

SOVIET MOON HIT DEMONSTRATES GUIDANCE PROWESS; Achievement on eve of Khrushchev's visit, predicted in Aug. 17 M/R, indicates high degree of accuracy in delivering ICBM's, by C. Paul Means, M/R Associate Editor, 9/21/59, p. 108.

Gyros

NORTH SEEKING GYRO IS ACCURATE WITHIN 5 SECONDS; 12/28/59, p. 23.

TODAY'S GYROS WON'T MEET TOMORROW'S NEEDS; Recent advances keep missile gyros up to present demands, but significant progress is needed for operational missiles and spacecraft, by Hal Gettings, M/R Associate Editor, 9/28/59, p. 15.

Industry & Markets

COMPUTER SIMULATION OF LAB TESTS MAY SAVE TIME, MONEY; Experiments during design phase indicate considerable economies are possible along with improved reliability; C-E-I-R's approach is described, by Charles D. LaFond, M/R Associate Editor, 12/21/59, p. 19.

ARNOUX DEVELOPING MAGNETOMETER FOR MISSILES AND SMALL SPACE VEHICLES; Arnoux Corp. has in prototype stage a device which should meet the low weight, small size and other demands of missiles and small space vehicles, 12/14/59, p. 25.

ENERGY CONVERSION GROWS IN IMPORTANCE; New stress on space and potential commercial uses gives impetus to search for more and better ways to convert energy directly to usable electricity, by Hal Gettings, M/R Associate Editor, 12/7/59, p. 22.

THE EXPLODING SEMICONDUCTOR INDUSTRY; It is already a half-billion-dollar-a-year business, and the total may double in five years unless imports hit the defense market, by Charles D. LaFond, 11/30/59, p. 23.

IR INDUSTRY IS SOLVING ITS COOLING PROBLEM; IR-Detector cells are behind the state-of-the art of cells, but R&D is closing the gap with better hardware and advanced methods, by Charles D. LaFond, M/R Associate Editor, 11/2/59, p. 16.

INFRARED INDUSTRY—BILLION-DOLLAR MARKET?; Opinions differ on sales potential of the complex field, but all agree that it has only been tapped; expansion rate depends on research breakthroughs, product development, by Charles D. LaFond, M/R Associate Editor, 10/26/59, p. 25.

TRANSDUCERS—A HEALTHY MARKET WITH VAST POTENTIAL; An M/R Survey shows 10% of the manufacturers now dominate sales, but opportunities are great for those who can solve remaining problems, by Charles D. LaFond, M/R Associate Editor, 10/12/59, p. 34.

TELEMETRY LEADS MISSILE DEVELOPMENT; but lack of unity and realistic standards hampers progress in this field vital to development of successful operational missiles, by Hal Gettings, M/R Associate Editor, 10/5/59, p. 15.

BATTERIES RETAIN MAJOR MISSILE POWER ROLE; Survey shows electrochemical batteries are desirable auxiliary power sources for many uses; sales expected to grow ten-fold, by Charles D. LaFond, 8/24/59, p. 15.

TELEMETRY RECEIVERS POST FEW PROBLEMS; One firm—NEMS-Clarke—does 95% of the business; receivers are considered the most reliable part of the telemetry system, by Hal Gettings, M/R Associate Editor, 8/24/59, p. 26.

APU'S—AN OFT-NEGLECTED $25 MILLION BUSINESS; Report shows that gas-turbines are first choice for missile auxiliary power units, with batteries close behind; exotic sources still in the future, crash programs make complications, by Hal Gettings, M/R Associate Editor, 8/17/59, p. 31.

ANTENNAS: THERE'S A LIMIT IN SIZE; What's needed is the ability to manufacture dishes and maintain them in an exposed environment to the close tolerances required, by Hal Gettings, M/R Associate Editor, 8/10/59, p. 18.

MAGNETIC TAPE RECORDING SALES BOOMING; This year should see 700,000 units sold but most promising future applications will be in astronautics for photo-reconnaissance, by Robinette E. McCabe, 8/3/59, p. 34.

NEW TECHNIQUES AID ELECTRONICS COOLING; Basic methods of heat dissipation in components are the same but the applications can vary. Here are principle methods, by Hal Gettings and Charles D. LaFond, M/R Associate Editors, 8/3/59, p. 38.

ELECTRONICS COOLING—MULTIMILLION-DOLLAR STEPCHILD; The demand for cooling units is growing. An M/R survey shows how the challenge is being met. First of two stories, by Hal Gettings and Charles D. LaFond, M/R Associate Editors, 7/27/59, p. 34.

INSTRUMENTATION: A FERTILE FIELD FOR NEW APPLICATIONS; Promising areas include microminiaturization, solid-state physics and communications technology, by Robert J. Jeffries, 7/20/59, p. 51.

A HOST OF TOUGH CHALLENGES; A survey of strides made by the electronics industry to meet its Space Age assignment—and how they will bring new markets, by David R. Hull, 7/20/59, p. 76.

THE REMARKABLE RELIABILITY OF FUZING AND ARMING; An outline of the accomplishments and tricky requirements in a secrecy-shrouded and largely government-controlled field, by Hal Gettings, M/R Associate Editor, 7/6/59, p. 30.

Infrared

WEST COAST INFRARED SYMPOSIUM INDICATES HUGE MARKET POTENTIAL; 12/7/59, p. 21.

IR INDUSTRY IS SOLVING ITS COOLING PROBLEM; IR-Detector cells are behind the state-of-the-art of cells, but R&D is closing the gap with better hardware and advanced methods, by Charles D. LaFond, M/R Associate Editor, 11/2/59, p. 16.

INFRARED INDUSTRY—BILLION-DOLLAR MARKET?; Opinions differ on sales potential of the complex field, but all agree that it has only been tapped; expansion rate depends on the research breakthroughs product development, by Charles D. LaFond, M/R Associate Editor, 10/26/59, p. 25.

HUGHES RESEARCH REVEALS ADVANCES IN INFRARED DETECTION; Shielding technique doubles IR search and tracking range; cooling methods treble detectivity of IR cells, 9/28/59, p. 19.

SYSTEM MAY BRING CIRCULAR ORBITS; General Electric's GESOC method of control is designed to correct elliptical orbits at apogee using infrared horizon sensors, 9/28/59, p. 31.

Instrumentation

ARNOUX DEVELOPING MAGNETOMETER FOR MISSILES AND SMALL SPACE VEHICLES; Arnoux Corp. has in prototype stage a device which should meet the low weight, small size and other demands of missiles and small space vehicles, 12/14/59, p. 25.

EMERSON'S PROLIFIC E&A DIVISION; Company compiles an enviable record in missile work and comes up with startling developments for the future while bucking "decentralization" trend, by Charles D. LaFond, M/R Associate Editor, 8/31/59, p. 28.

INSTRUMENTATION: A FERTILE FIELD FOR NEW APPLICATIONS; Promising areas include microminiaturization, solid-state physics and communications technology, by Robert J. Jeffries, 7/20/59, p. 51.

Manufacturing and Production

X-RAYS OPEN UP MATERIALS ANALYSIS; Penetrating radiation should provide new market for complete automatic inspection of components, by J. D. Webster, 12/7/59, p. 20.

EYELETS VS. PLATED-THRU HOLES IN PRINTED CIRCUITRY; A report on a comprehensive test in which all located failures were in eyeletted phenolic boards, by Barnard C. Alzua, Jr., 7/27/59, p. 37.

Measurements

SPACE AGE CONTRIBUTIONS OF BUREAU OF STANDARDS; NBS serves government and industry by providing standards and calibrations facilities demanded by requirements of the new technology, by Hal Gettings, M/R Associate Editor, 12/14/59, p. 30.

NBS PRESSES RESEARCH ON DIELECTRICS; A broad study, partly funded by the Pentagon, is aimed at obtaining better measurements and materials, 10/19/59, p. 37.

Miniaturization

MICROMINIATURIZATION—A REVOLUTION IS WELL UNDER WAY; A report on the dramatic development of a concept that will be here in full force in about two years, saving millions of dollars and enhancing reliability, by Charles D. LaFond and James Baar, M/R Associate Editors, 9/14/59, p. 18.

Plasma

RUSSIANS MAY USE LIGHTNING AS A WEAPON; Soviet scientists are researching possibilities of artificial lightning and may have made machines to create anti-missile "balls of fire," by Donald J. Ritchie, 8/24/59, p. 13.

Radar

RADAR OPERATIONAL SIMULATION KEEPS NAVY ALERT; Servonics device already operational supplies realistic blips, could be used in solving tactical problems, by William E. Howard, M/R Associate Editor, 11/30/59, p. 37.

HOT-NOSE MISSILES NEED BETTER RADOMES; Super ceramics are being developed and new fabrication methods make alumina promising for high-temperature uses replacing plastics, by Hal Gettings, M/R Associate Editor, 11/23/59, p. 34.

VIDEOTAPE SUCCESSFULLY USED TO RECORD RADAR SIGNALS; Army's Signal Missile Support Agency finds great advantage in immediate playback capability for trajectory evaluation, 9/28/59, p. 24.

BMEWS—A BILLION-DOLLAR INVESTMENT WITH A SINGLE GOAL; America's electronics giants work to give 15-minute warning of ICBM attack, by Charles D. LaFond, M/R Associate Editor, 9/21/59, p. 67.

PROJECT TEPEE MAY UNDERCUT NEED FOR BMEWS; But the new development will only supplement Midas, 8/17/59, p. 45.

Radiation

MICROWAVE 'HAZARDS' ARE EXAGGERATED; The misunderstanding of biological effects of high-power fields has plagued military and industry; research is providing answers, by Charles D. LaFond, M/R Associate Editor, 12/14/59, p. 20.

X-RAYS OPEN MATERIALS ANALYSIS; Penetrating radiation should provide new market for complete automatic inspection of components, by J. D. Webster, 12/7/59, p. 20.

PROJECT HERO EXPLORES R-F RADIATION HAZARDS; Unpublicized Navy research seeks to identify and control electromagnetic dangers to missiles, by Hal Gettings, M/R Associate Editor, 10/19/59, p. 21.

Search, Detection and Tracking

HUGHES RESEARCH REVEALS ADVANCES IN INFRARED DETECTION; Shielding technique doubles IR search and tracking range; cooling methods treble detectivity of IR cells, 9/28/59, p. 19.

BMEWS—A BILLION-DOLLAR INVESTMENT WITH A SINGLE GOAL; America's electronics giants work to give 15-minute warning of ICBM attack, by Charles D. LaFond, M/R Associate Editor, 9/21/59, p. 67.

PROJECT TEPEE MAY UNDERCUT NEED FOR BMEWS; But the new development will only supplement Midas, 8/17/59, p. 45.

EXPLORER VI GIVES NASA NEW TRACKING CAPABILITY; Solar-celled power unit slated for deep space probe, 8/17/59, p. 46.

TORPEDOES—NEGLECTED FACTOR IN ASW; Between wars we forget about them but they'll have to be vastly more sophisticated and reliable if they are to be equal to their mission in coping with missile submarine threat, by Hal Gettings, M/R Associate Editor, 8/10/59, p. 30.

DETECTION OF NUCLEAR EXPLOSIONS IN SPACE POSSIBLE BY OPTICS; Two spectroscopes mounted in satellite proposed as method surveillance, by Savo Coric, 8/3/59, p. 32.

ASTROMETRY: A VITAL PROGRAM IS STILL LACKING SUPPORT; Continuous location of spacecraft will demand more equipment and development of new methods for using it, by Dr. Douglas Duke, 7/20/59, p. 56.

Telemetry

HIGHLIGHTS OF RAS-IAS ANNUAL CONFERENCE; Canadians say transmitter withstands half-million G's, by an M/R Correspondent, 10/19/59, p. 25.

TELEMETRY LEADS MISSILE DEVELOPMENT; But lack of unity and realistic standards hampers progress in this field vital to development of successful operational missiles, by Hal Gettings, M/R Associate Editor, 10/5/59, p. 15.

PROMISE OF NEW 'DECISION THRESHOLD COMPUTER'; Simple device performs well in NATO scatter stations and is expected to find application in telemetry, especially over long distances, by Charles D. LaFond, M/R Associate Editor, 8/24/59, p. 18.

TELEMETRY RECEIVERS POST FEW PROBLEMS; One firm—NEMS-Clarke—does 95% of the business; receivers are considered the most reliable part of the telemetry system, by Hal Gettings, M/R Associate Editor, 8/24/59, p. 26.

Test & Checkout

COMPUTER SIMULATION OF LAB TESTS MAY SAVE TIME, MONEY; Experiments during design phase indicate considerable economies are possible along with improved reliability; C-E-I-R's approach is described, by Charles D. LaFond, M/R Associate Editor, 12/21/59, p. 19.

Transducers

TRANSDUCERS—A HEALTHY MARKET WITH VAST POTENTIAL; An M/R survey shows 10% of the manufacturers now dominate sales, but opportunities are great for those who can solve remaining problems, by Charles D. LaFond, M/R Associate Editor, 10/12/59, p. 34.

Transistors, Tubes and Semiconductors

THE EXPLODING SEMICONDUCTOR INDUSTRY; Already a half-billion-dollar-a-year business, the total may double in five years unless imports hit the defense market, by Charles D. LaFond, M/R Associate Editor, 11/30/59, p. 23.

GE'S 'TUNNEL DIODE' MAY OUTSTRIP TRANSISTORS; 7/27/59, p. 44.

ASTRONOMY

Moon

LUNAR SURFACE ANALYZED; Moscow briefs, 12/21/59, p. 42.

LUNIK II IMPACT MAY HAVE CONTAMINATED THE MOON; 12/21/59, p. 40.

ASTROPHYSICS

Nucleonics

DETECTION OF NUCLEAR EXPLOSIONS IN SPACE POSSIBLE BY OPTICS; Two spectroscopes mounted in satellite proposed as method surveillance, by Savo Coric, 8/3/59, p. 32.

Radiation

THE VAN ALLEN BELTS DISCOVERY MOST IMPORTANT; U.S. has obtained more fundamental scientific information from its satellites than the Soviets have gained with heavier payloads, by Dr. Robert Jastrow, 7/20/59, p. 43.

CONFERENCES AND EXHIBITIONS

20 TECHNICAL SESSIONS SET FOR IRE'S LOS ANGELES CONVENTION, 12/28/59, p. 23.

WEST COAST INFRARED SYMPOSIUM INDICATES HUGE MARKET POTENTIAL; 12/7/59, p. 21.

ABSTRACTS FROM THE ARS WASHINGTON MEETING; A further listing of significant papers presented during the recent sessions, 11/30/59, p. 39.

ARS MEETS IN WASHINGTON; M/R's coverage includes abstracts of many of the most significant papers presented, 11/23/59, p. 76.

ROCKET SOCIETY'S WASHINGTON MEETING TO DRAW 7000; Five Russians due at Nov. 16-19 sessions; McCone, Von Braun among featured speakers, 11/9/59, p. 15.

BETTER STEELS FROM RESEARCH; by J. J. Heger,

MISSILE 'INNARDS' MUST TAKE SPACE RIGORS;

NEC HEARS REPORTS ON EXPLORERS VI, VII; by an M/R Correspondent, 10/26/59, p. 34.

ION ROCKETS LEAD IN 'EXOTIC' PROPULSION; This was reported at the only open session of the Second Symposium on Advanced Propulsion Concepts, jointly sponsored by Avco-Everett Research Laboratory and AF Office of Scientific Research. Abstracts are included, 10/12/59, p. 28.

NO FUTURE FOR SOLIDS IN SPACE SHIPS; American Chemical Society hears that solids lack momentum needed for large vehicles. Convention also views advances in plastics, elastomers and polyurethanes, by John F. Judge, M/R Associate Editor, 9/28/59, p. 33.

NERVE CELL RESEARCH URGED FOR 'DECISION MAKING' GUIDANCE; Armed Forces Chemical Association also hears of need for work in dielectric behavior in space, by John Judge, M/R Associate Editor, 9/21/59, p. 85.

IAF CONGRESS HEARS PAPERS COVERING THE SPACE FIELD; A special service; abstracts from some of the most significant papers at the recent London meeting; emphasis on space medicine and magnetohydrodynamics, by Donald E. Perry, M/R Managing Editor, and Anthony Vandyk, M/R Geneva Bureau Chief, 9/14/59, p. 37.

WESCON SHOW EMPHASIZES DESIGN; by Frank McGuire, M/R Associate Editor, 8/31/59, p. 34.

IAF LONDON MEETING MAY SET ATTENDANCE RECORD; 8/24/59, p. 14.

WESCON TRYING NEW METHOD FOR TECHNICAL PAPERS; 8/10/59, p. 20.

RECRUITING HEAVY AT MILITARY ELECTRONICS MEET; M/R Staff, 7/6/59, p. 36.

FOREIGN ASTRONAUTICS

Canada

THE CASE FOR A POLAR LAUNCHING SITE IN CANADA; Two Canadian experts outline the advantages which would come from building a polar-orbit launching facility at Moosonee in the Far North; chief among them is reduction of radiation hazards, 11/16/59, p. 18.

France

SEPR ADVANCES; French firm develops solid fuel engines, 12/14/59, p. 16.

FRENCH SS-10, SS-11 FIGURE IN ARMY AIRPOWER; Both birds may be used on fast helicopters and fixed-wing aircraft; new R&D SS-12 may also join the arsenal, by James Baar, M/R Associate Editor, 10/14/59, p. 26.

Germany

GERMANS SET UP REGULAR ROCKET MAIL DELIVERY; by an M/R Correspondent, 9/28/59, p. 30.

Great Britain

HEAVY SOVIET MISSILE EDGE REPORTED; by G. V. E. Thompson, 12/21/59, p. 23.

SIMPLIFIED MILITARY ROCKETS; 12/21/59, p. 28.

BIG LIQUID HYDROGEN PLANT PROPOSED; by G. V. E. Thompson, M/R Contributing Editor, 12/7/59, p. 40.

MATS HANDLES THORS AS DELICATELY AS EGGS; A special report by M/R Managing Editor Donald E. Perry, first newsman to accompany a Thor on its transatlantic trip, 11/16/59, p. 16.

BRITISH READY TO PRESS SPACE PROGRAM; by G. V. E. Thompson, M/R Contributing Editor, 11/9/59, p. 34.

BRITISH SCIENTISTS CLAMOR FOR A MAJOR SPACE ROLE; But there's mixed reaction to a proposal that Blue Streak and Black Knight be combined as vehicle to replace officially approved Scout, by Donald E. Perry, M/R Managing Editor, 9/7/59, p. 11.

THE WEDDING WOULD HAVE ITS PROBLEMS; Blue Streak and Black Knight, 9/7/59, p. 12.

RAF THOR BASE ON 15-MINUTE ALERT; The Western World's first ballistic missile site has had 400 simulated countdowns; three more bases will be operational by next summer, by Clarke Newlon, M/R Executive Editor, 7/27/59, p. 11.

BRITISH ASTRONAUTICS; Armstrong Whitworth unveils its Flutter Dart rocket test vehicle; Rocketdyne's Dixon on storable propellants; Astronautical conferences coming up, by G. V. E. Thompson, M/R Contributing Editor, 7/13/59, p. 18.

Japan

JAPAN GETTING MORE SIDEWINDERS; by an M/R Correspondent, 12/21/59, p. 23.

USSR

HEAVY SOVIET MISSILE EDGE REPORTED; by G. V. E. Thompson, 12/21/59, p. 23.

LUNAR SURFACE ANALYZED; Moscow Briefs, 12/21/59, p. 42.

LUNIK IMPACT MAY HAVE CONTAMINATED THE MOON; 12/21/59, p. 40.

RED SCIENTISTS CRITICIZED BY RUSSIAN ACADEMECIANS; Moscow Briefs, 12/21/59, p. 42.

SOVIET AFFAIRS; Rare earth elements, by Dr. Albert Parry, M/R Contributing Editor, 12/14/59, p. 36.

WE CAN CATCH RUSSIANS IN SPACE; Editorial, 12/14/59, p. 50.

SOVIET ROCKETS EXPLOIT GERMAN TECHNOLOGY; An M/R exclusive article by an expert, Donald J. Ritchie of Bendix, tells how the Russians sacrificed ease of fabrication and production to profit from the reliability of the V-2; Reds are heavily researching hydrogen-fluorine rockets, 12/7/59, p. 17.

BORANE FOR COOLING; Soviet Affairs, 12/7/59, p. 46.

CRIMEAN TELESCOPE AMONG WORLD'S LARGEST; Soviet Affairs, 12/7/59, p. 46.

NEW FORMING PROCESS?; Soviet Affairs, 12/7/59, p. 46.

STATIONARY ORBITS; Soviet Affairs, 12/7/59, p. 46.

VEGETATION ON MARS?; Soviet Affairs, 12/7/59, p. 46.

WHO SAYS THERE'S A SPACE RACE?; A condensation of a penetrating speech by Dr. Eberhardt Rechtin, Chief of the Telecommunications Division, Jet Propulsion Laboratory, NASA, summing up Soviet gains from space feats and calling on the US to decide whether to drop out of space or accept the challenge—and its costs, 11/30/59, p. 26.

RED THERMOELECTRIC BREAKTHROUGH—FACT OR FICTION?; Tass reports Soviets have achieved thermal efficiencies twice as high as theoretically possible; U.S. scientists' reaction is mixed, by Hal Gettings, M/R Associate Editor, 11/16/59, p. 11.

ATOMIC BATTERY RESEARCH; Soviet Affairs, 11/16/59, p. 15.

NEW RESEARCH CENTER; Soviet Affairs, 11/16/59, p. 15.

PLANET-BASED RADIOS FOR GUIDANCE; Soviet Affairs, 11/16/59, p. 15.

POLYETHYLENE LAG HIT; Soviet Affairs, 11/16/59, p. 15.

PULSE-AMPLITUDE ANALYZER; Soviet Affairs 11/16/59, p. 15.

RADIATION EXPERIMENT; Soviet Affairs, 11/16/59, p. 15.

SUPERIOR MAGNETOMETER?; Soviet Affairs, 11/16/59, p. 15.

MOSCOW BRIEFS; by Dr. Albert Parry, 11/9/59, p. 32.

THE RUSSIANS SCORE AGAIN; editorial, 11/2/59, p. 50.

SOVIET 'FAR SIDE' PHOTO CONFIRMS M/R PREDICTION; 11/2/59, p. 13.

SOVIETS PREDICT TWO-COUPLE MOON ORBIT BY SPRING; German newspaper also quotes Red scientists as saying plans call for two-man earth orbit by the end of this year; moon trip would coincide with Eisenhower visit, 10/26/59, p. 18.

SOVIET AFFAIRS; Lunik, by Dr. Albert Parry, M/R Contributing Editor, 10/19/59, p. 36.

SOVIETS USE MOON TO GIVE LUNIK III RECORD ORBIT; The new satellite, slowed and turned back toward earth by moon's gravity, should provide a wealth of valuable data, by C. Paul Means, M/R Associate Editor, 10/12/59, p. 47.

SOVIET MOON HIT DEMONSTRATES GUIDANCE PROWESS; Achievement on eve of Khruschchev's visit, predicted in Aug. 17, M/R, indicates high degree of accuracy in delivering ICBM's, by Paul Means, M/R Associate Editor, 9/21/59, p. 108.

CZECH MAGAZINE PINPOINTS SOVIET LAUNCH BASE; Article in aviation journal locates the new satellite and missile base northeast of the Aral Sea and provides some new details on Mechta, by C. Paul Means, M/R Associate Editor, 9/7/59, p. 21.

RED ASTRONAUTS NOT YET CHOSEN; by an M/R Correspondent, 9/7/59, p. 43.

RUSSIANS MAY USE LIGHTNING AS A WEAPON; Soviet scientists are researching possibilities of artificial lightning and may have made machines to create anti-missile "balls of fire," by Donald J. Ritchie, 8/24/59, p. 13.

SOVIET SUBS BIGGER THREAT THAN ICBM'S; Intelligence reports assume Reds converting to nuclear and deep diving boats armed with Komet III IRBM, Red China now third biggest submarine builder, by James Baar, M/R Associate Editor, 8/10/59, p. 32.

SOVIETS LAUNCH AND RECOVER TWO DOGS AND A RABBIT; by M/R Staff, 7/13/59, p. 45.

MATERIALS

Ceramics, Insulation & Coatings

ALUMINA KILNS IN OPERATION; by R. C. LeMay, 11/23/59, p. 41.

BERYLLIUM OXIDE'S BIG ROLE; by Donald C. deGruchy, 11/23/59, p. 41.

CERAMIC COATINGS BEAT HEAT; by Roland J. Westerholm, 11/23/59, p. 43.

COATING ADVANCE: NUMEC APPLIES METAL TO CERAMIC PARTICLES; 12/7/59, p. 41.

INSULATION SYSTEMS FORESEEN; by E. F. Briggs, 11/23/59, p. 42.

PLASMA JET AIDS IN COATING; by Ben Lohrie, 11/23/59, p. 43.

Environmental Effects

HOT NOSE MISSILES NEED BETTER RADOMES; Super ceramics are being developed and new fabrication methods make alumina promising for high-temperature uses replacing plastics, by Hal Gettings, M/R Associate Editor, 11/23/59, p. 34.

MERCURY NEEDS BASED ON SAFETY; NASA and capsule contractors pick laminated glass fiber and resin for heat shield, nickel cobalt for outside skin, titanium for inner vessel, by C. Paul Means, M/R Associate Editor, 11/23/59, p. 35.

STRUCTURAL STRENGTH IS MAJOR HURDLE; Flaws in building materials cause many missile failures; poor industry communications often a factor; objectivity, research in materials needed, by Edward S. Hull, 11/23/59, p. 17.

TEMPERATURE BARRIER SLOWS PROGRESS; Refractories need oxidation-resistant coatings; ceramics too porous or brittle; cermets unreliable; AF bets $6 million on graphite, by John Judge, M/R Associate Editor, 11/23/59, p. 15.

WHAT CAN WITHSTAND RE-ENTRY HEAT?; Bell Aircraft engineers find coated molybdenum, dense silicon carbide and coated graphite best for leading edge of boost-glide planes such as Dyna-Soar, 8/3/59, p. 24.

MATERIALS: HEAT REMAINS THE MAJOR PROBLEM; An examination of the broad environmental criteria which underline the need for comprehensive R&D, by Lt. Col. Frederick C. Krug, ARDC, 7/20/59, p. 90.

Explosive Forming

EXPLOSIONS FORM MISSILE METAL PARTS; by John S. Rinehart, 11/23/59, p. 72.

METHOD CAN INCREASE DEFORMING ABILITY; by DuPont Explosives Dept., 11/23/59, p. 74.

PROCESS MIGHT BE USED IN SPACE WORK; by Vasil Philipchuk, 11/23/59, p. 74.

Gas

HELIUM SUPPLY MEETS CURRENT NEEDS; But unless steps are taken to prevent waste supply will not meet demands beyond 1980, by David Newman, M/R Editorial Assistant, 11/9/59, p. 30.

General

NBS STUDIES ELECTRIC ARC AS HIGH-TEMPERATURE SOURCE; 12/21/59; p. 22.

TEMPLE STUDIES HIGH TEMPERATURE FLAMES; A report on the intensive investigations conducted by the university's research institute with a rocket facility which should lead to high-energy breakthroughs, by William L. Doyle, 12/14/59, p. 17.

MATERIALS: A NEW ERA BEGINS; All elements, all compounds will be used to meet stern demands of space and nuclear technology; hundreds of millions spent on materials research, by Jay Holmes, M/R Associate Editor, 11/23/59, p. 13.

MATERIALS RESEARCH CALLED INADEQUATE; by John N. Dick, 11/23/59, p. 54.

INERT GAS BRAZING ROOM PROPOSED; Aerospace industries suggest manufacturers study joint establishment of 'space room' for high temp. work on metals, 8/3/59, p. 22.

Metals

EVEN WITH GOLD, SCOUT 'POOR'; 12/21/59, p. 18.

'WHISKER' RESEARCH IS PRESSED BY GOVERNMENT AND INDUSTRY; Five to 10 years may bring usable materials with strength up to six times that of steel, by Jay Holmes, M/R Associate Editor, 7/6/59 p. 27.

Metals: Aluminum

ALUMINUM ALLOYS EASILY WELDED; by Melvin C. Duke, 11/23/59, p. 59.

ENTIRE SYSTEM OF ALUMINUM? by H. G. McLaughlin, 11/23/59, p. 58.

MATHIESON WELDS Al-Cu ALLOY; by Dr. Joseph H. McLain and Dr. Michael J. Pryor, 11/23/59, p. 58.

STRUCTURAL ALUMINUM LIGHTER; by W. C. Woodward, 11/23/59, p. 58.

ALUMINUM USE IN MISSILES IS ON THE INCREASE; Lightweight, low-cost material is already used by hundreds of millions of pounds; greatest market may be in missile support, by C. Paul Means, M/R Associate Editor, 7/6/59, p. 18.

Metals: Copper

COPPER PASSES RUGGED TESTS; by T. E. Veltfort, 11/23/59, p. 60.

Metals: Iron

MALLEABLE HAS GOOD $$ RATIO; by Malleable Iron Founders Society, 11/23/59, p. 61.

Metals: Refractory

BERYLLIUM LIGHTENS GYROS; by O. F. Quartullo, 11/23/59, p. 61.

EXPLORING BERYLLIUM'S EXCITING POTENTIAL; A. Martin Co. metals researcher says the technology must be greatly expanded before it can become a truly useful material, by Charles J. Giemza, 9/7/59, p. 22.

MACHINING MOLYBDENUM ALLOYS, by George H. Waldeck, 11/23/59, p. 38.

METHOD FOUND FOR STRUCTURAL MOLYBDENUM WELDING; Finn Aeronautical Division achieves unheard-of ductility and arouses enthusiasm in industry and government, by John F. Judge, M/R Associate Editor, 10/26/59, p. 40.

MOLY GAINS POINT THE WAY; by Charles W. Brunstetter, 11/23/59, p. 38.

REFRACTORY METALS RESEARCH IS INTENSIFIED; Hundreds of firms are pressing R&D on the heat-resistant metals that hold answers to many of the toughest missile/space problems, by S. David Pursglove, 8/31/59, p. 13.

TANTALUM EASY TO FABRICATE; by Dr. James H. Gardner, 11/23/59, p. 41.

TUNGSTEN SHAPES NOW ON HAND; by John C. Redmond, 11/23/59, p. 39.

Metals: Steel

AUSTENITIC ALLOYS STRONGER; by J. Bulina, 11/23/59, p. 56.

BETTER STEELS FROM RESEARCH; by J. J. Heger, 11/23/59, p. 56.

REPUBLIC REDUCES IMPURITIES; by J. A. Rinebolt, 11/23/59, p. 54.

VASCOJET CAN BE ROLL-FORMED; by Dr. John C. Hamaker, Jr., 11/23/59, p. 54.

Metals: Titanium

TITANIUM INCREASES PAYLOAD; by E. F. Erbin, 11/23/59, p. 61.

TITANIUM, PLASTICS GAIN IN ROCKET CASES; These materials may someday form boosters and second stages, although steel is still tops now because of its low cost and familiarity, by Jay Holmes, M/R Associate Editor, 10/12/59, p. 29.

Metal Working

HUFFORD SPIN FORGES AHEAD; Firm will have 120" diameter machine operating by next July; modification could give 150" capacity, 12/7/59, p. 27.

100% EFFICIENT WELDS NEEDED; by Ludwig Roth, 11/23/59, p. 62.

DEEP DRAWING OBVIATES WELDS; by Larry Shiller, 11/23/59, p. 64.

FORGING CUTS COMPONENT COSTS; by William C. Kunkler, 11/23/59, p. 63.

FUSION WELD MUST FOR JOINTS; by J. H. Berryman, 11/23/59, p. 69.

HEAT-TREAT PLUS COLD ROLLING; by Michael Watter, 11/23/59, p. 70.

HELIARC WELDING INCREASING; by G. W. Oyler, 11/23/59, p. 69.

HOW HONEYCOMB PANEL WORKS; by Harold J. Black, 11/23/59, p. 70.

MISSILE MACHINING DEMANDS ACCURACY CONTROL; by A. B. Albrecht, 11/23/59, p. 68.

ROLL FORMING ART ADVANCES; by Richard H. Gade, 11/23/59, p. 66.

SHEAR FORMING SPELLS SAVING; by Wayne Stone, 11/23/59, p. 64.

SKULL CASTING HOLDS PROMISE; by A. E. LaMarche, 11/23/59, p. 68.

SPINNING FILLS MANY NEEDS; by John H. Owens, 11/23/59, p. 66.

UNIT CUTS FRAGILE MATERIALS; by S. S. White Dental Mfg. Co., 11/23/59, p. 68.

RESOLUTION IN ELECTROLYTIC MACHINING; Anocut engineers develop cavity sink device to meet metal working challenge of Space Age. A report on this and other recent advances, by John F. Judge, M/R Associate Editor, 11/2/59, p. 29.

METHOD FOUND FOR STRUCTURAL MOLYBDENUM WELDING; Finn Aeronautical Division achieves unheard-of ductility and arouses enthusiasm in industry and government, by John F. Judge, M/R Associate Editor, 10/26/59, p. 40.

BREAKTHROUGH IN HEAT TREAT PROMISES HUGE STRENGTH GAINS; Barrett process gives ultimate metal tensile strength 10% to 60% higher with improved ductility; company expects one-million psi in 18 months, by Frank G. McGuire, 9/28/59, p. 10.

LINDBERG'S FURNACE—THE LATEST IN HEAT TREATING; 8/24/59, p. 28.

REYNOLDS NEW ALUMINUM BACK-UP FOR ALUMINUM WELDING; 7/20/59, p. 107.

Outlook

X-RAYS OPEN UP MATERIALS ANALYSIS; Penetrating radiation should provide new market for complete automatic inspection of components, by J. D. Webster, 12/7/59, p. 20.

CALL FOR SCIENTIFIC APPROACH; by Coleman Raphael, 11/23/59, p. 30.

COPING WITH HIGH FLAME HEAT; by Eugene L. Olcott, 11/23/59, p. 28.

EFFECTS OF ENVIRONMENTS; by John Van Hamersveld, 11/23/59, p. 31.

FUTURE TEMPERATURE PROBLEMS; by Harry A. Campbell, 11/23/59, p. 32.

MATERIALS WILL HAVE TO OUTDO THEMSELVES; by Dr. George J. Mills, 11/23/59, p. 27.

MISSILE 'INNARDS' MUST TAKE SPACE RIGORS; by Frank McGinnis, 11/23/59, p. 26.

NO MAGIC MATERIALS IN SIGHT; by John L. McDaniel, 11/23/59, p. 31.

PUSHING UP I_{sp} BRINGS FRESH PROBLEMS; by Dr. Morris A. Steinberg, 11/23/59, p. 28.

ROCKETS MUST BE LIGHTER, MORE RELIABLE; by L. L. Gilbert, 11/23/59, p. 21.

STRUCTURAL MATERIALS FACE TOUGH DEMANDS; by A. A. Watts, 11/23/59, p. 19.

THE GROWING ROLE OF MATERIALS ENGINEER; by N. J. Hoffman and D. E. Roda, 11/23/59, p. 22.

NBS PRESSES RESEARCH ON DIELECTRICS; A broad study, partly funded by the Pentagon is aimed at obtaining better measurements and materials, 10/19/59, p. 37.

EMERSON'S PROLIFIC E&A DIVISION; Company compiles an enviable record in missile work and comes up with startling developments for the future while bucking "decentralization" trend, by Charles D. LaFond, M/R Associate Editor, 8/31/59, p. 28.

Plastics

AID FROM SILICONE RUBBERS; by Robert Treat Jr., 11/23/59, p. 48.

DEMAND GROWS FOR ASTROLITE; by W. E. Benke, 11/23/59, p. 48.

FILAMENT WINDING FOR CASES; by Richard E. Young, 11/23/59, p. 49.

MORE AND VARIED USES SEEN; by John H. Lux, 11/23/59, p. 46.

NEW IDEAL FOR THERMAL BARRIER; by J. C. Siegle and P. H. Settlage, 11/23/59, p. 46.

OLD ITEMS FIND SPACE USES; by F. William Jahns, Jr., 11/23/59, p. 48.

PHENOLICS GAIN IN MISSILE USES; by Minert E. Hull, 11/23/59, p. 51.

RE-ENTRY VEHICLES USE ABLATION PLASTICS; by L. R. McCreight, 11/23/59, p. 43.

STRENGTH LEVELS TO DOUBLE; by Howard Meinke, 11/23/59, p. 52.

VERSATILE LAMINATED PLASTICS; by Dr. Carlisle M. Thacker, 11/23/59, p. 49.

TITANIUM, PLASTICS GAIN IN ROCKET CASES; These materials may someday form boosters and second stages, although steel is still tops now because of its low cost and familiarity, by Jay Holmes, M/R Associate Editor, 10/12/59, p. 29.

Tubing

FIBER GLASS TOUGHENED TEFLON; by Titeflex, Inc., 11/23/59, p. 52.

SWAGE FITTED TEFLON TUBES; by R. C. Ramé, 11/23/59, p. 52.

MISSILES, SATELLITES AND RESEARCH VEHICLES

SECOND EDITION OF M/R ASTROLOG; Latest status report on all U.S. missiles, rockets and space vehicles, plus a new listing of all satellites, U.S. and Russian, now in orbit by M/R Staff, 11/9/59, p. 25.

FIRST EDITION OF M/R ASTROLOG; For the reader's convenience, an easy-reference status report on all space vehicles and missiles, by M/R Staff, 9/7/59, p. 25.

ANNUAL MISSILE ENCYCLOPEDIA; A comprehensive illustrated listing of U.S., Allied and Soviet missiles, by M/R Staff, 7/20/59, p. 137.

Missiles

THE AIR FORCE REAPPRAISES THE TITAN PROGRAM; The Ballistic Missile Division reportedly has concluded the missile is basically sound and has place in defense plans; upshot may be thorough congressional investigation of entire ICBM picture, by William J. Coughlin, M/R Los Angeles Bureau Chief, 12/21/59, p. 43.

IROQUOIS PACKS SIX SS-11's; by an M/R Correspondent, 12/14/59, p. 29.

NAVY SEEKS ANTI-MISSILE BIRDS; by James Baar, M/R Associate Editor, 12/14/59, p. 40.

MISSILE NEWS IN RECENT PICTURES; 11/9/59, p. 35.

TRIPLE-THREAT TALOS FOR ANTI-AIR, BOMBARDMENT, AICBM; The new Talos will be able to hit planes 100 miles away; Super Talos may be the seaborne defense for U.S. mainland; by James Baar, M/R Associate Editor, 9/21/59, p. 24.

THE ABLE TO DELTA SUCCESS STORY; A history of the progress of the Aerojet-General system from four failures in the Vanguard program to a perfect batting average with Thor-Able, by Frank McGuire, M/R Associate Editor, 8/24/59, p. 22.

REDEYE AND BULLPUP; Bazooka-type missile details released; Martin ASM becomes operational in Atlantic Fleet, by James Baar, M/R Associate Editor, 8/3/59, p. 12.

NAVY'S CORVUS HAS FIRST SUCCESSFUL FLIGHT; 7/27/59, p. 43.

HAWK AND LACROSSE ARE ADDED TO ARMY'S ARSENAL; Artillery units are organized in Texas to train in their use, by M/R Staff, 7/6/59, p. 28.

Research Vehicles

AIR FORCE SWINGS BACK INTO SPACE WITH AWARD OF ADVANCED DYNA-SOAR PROGRAM; by James Baar, M/R Associate Editor, 11/16/59, p. 49.

LANDING ACCIDENT TO DELAY X-15 PLANS; 11/16/59, p. 11.

Satellites

BACKGROUND ON THE POSTPONED THOR-ABLE PROBE; NASA's planned sun orbiter, Thor-Able IV, could stay within tracking range until May, expanding communication know-how and providing new information on solar system, 12/21/59, p. 17.

EXPLORER VI MAY SOLVE PUZZLE OF REPETITIOUS RADIO SIGNALS; 11/9/59, p. 24.

NEC HEARS REPORTS ON EXPLORERS VI, VII; by an M/R Correspondent, 10/26/59, p. 34.

EXPLORER VII GOES INTO POSSIBLE 20-YEAR ORBIT; 10/19/59, p. 16.

NASA PLANS TO LAUNCH A SATELLITE NEAR VENUS; Thor-Able shot would be trackable beyond 50 million miles and could help restore U.S. prestige, by C. Paul Means, M/R Associate Editor, 10/19/59, p. 33.

TRANSIT STILL DUE TO BE FIRST MILITARY SPACE SYSTEM; Despite last month's launching failure, the ARPA-Navy project is proceeding on schedule calling for prototypes in orbit by early 1961; money problems could still bring delays, by James Baar, M/R Associate Editor, 10/12/59, p. 16.

VANGUARD CONTRIBUTED GREATLY TO SPACE TECHNOLOGY; The nation's first designed space vehicle was a greater success than failures indicated and its components are used in most newer spacecraft, by C. Paul Means, M/R Associate Editor, 9/28/59, p. 35.

NASA MAY TRY MOON ORBIT IN OCTOBER; Space agency to use Atlas-Able vehicle which was earlier scheduled for Venus probe, by C. Paul Means, M/R Associate Editor, 8/24/59, p. 33.

EXPLORER VI GIVES NASA NEW TRACKING CAPABILITY; Solar-celled power unit slated for deep space probe, 8/17/59, p. 46.

PROJECT TEPEE MAY UNDERCUT NEED FOR BMEWS; 8/17/59, p. 45.

Space Vehicles

EVEN WITH GOLD, SCOUT 'POOR'; 12/21/59, p. 18.

VEGA OUT, HOPES PINNED ON CENTAUR; Delay in schedule thought to be primary reason for cancellation and reshuffling; the Air Force's Atlas-Agena will be used as an interim vehicle, by C. Paul Means, M/R Associate Editor, 12/21/59, p. 15.

Undersea Warfare

SOVIET SUBS BIGGER THREAT THAN ICBM'S; Intelligence reports assume Reds converting to nuclear and deep diving boats armed with Komet III IRBM, Red China now third biggest submarine builder, by James Baar, M/R Associate Editor, 8/10/59, p. 32.

TORPEDOES—NEGLECTED FACTOR IN ASW; Between wars we forget about them but they'll have to be vastly more sophisticated and reliable if they are to be equal to their mission in coping with missile submarine threat, by Hal Gettings, M/R Associate Editor, 8/10/59, p. 30.

MISSILE SUPPORT

General

HOW TO PICK LIQUID TANK MATERIALS; An Army expert outlines how compatibility and strength vary as prime factors, 10/19/59, p. 35.

ICBM FACILITIES WILL COST $550 MILLION IN FY60; An account of requirements in the top U.S. design and construction program, by Lt. Col. Charles B. Alexander, Jr., USAF and Fred E. Ressegieu, 9/21/59, p. 46.

MANAGEMENT—MAJOR SUPPORT PROBLEM; editorial, 9/21/59, p. 122.

SUPPORT MARKET MAY TOTAL $40 BILLION BY 1967; Hardened ICBM bases and Polaris submarines are setting the pace for expansion. A complete forecast for 1960-61, by William E. Howard, M/R Associate Editor, 9/21/59, p. 21.

SOLARIS WILL SALVAGE MISSILES FROM THE DEEP; Low-cost system being developed by Vitro Laboratories should find wide range of uses, including eventual work in charting ocean bottom, by William E. Howard, M/R Associate Editor, 8/31/59, p. 16.

AIR-SUPPORT SPACE PLATFORM ADVOCATED; 8/10/59, p. 36.

MISSILE SUPPORT: THE BIGGER PROBLEMS COMING WITH LARGER VEHICLES; Army Corps of Engineers has the responsibility for solving most of the engineering difficulties ahead, an interview with Maj. Gen. E. C. Itschner, Chief of Engineers, 7/20/59, p. 48.

Launching Facilities

ARGUELLO, PAST, PRESENT AND FUTURE; Details of PMR's Point Arguello facility, including first published pictures, by James Baar and William E. Howard, M/R Associate Editors, 12/28/59, p. 13.

AF, NAVY FIGHT FOR TOP WEST COAST LAUNCHING ROLE; The Air Force wants to use Atlas pads at Vandenberg for polar-orbit launchings which would cross Navy's Pacific Missile Range facility at Point Arguello; Navy is already bothered by Vandenberg's effect on PMR. A special report by James Baar and William E. Howard, M/R Associate Editors, 12/21/59, p. 10.

NAVY PUSHES FOR BIG FLEET OF POLARIS CRUISERS; It urges eventual deployment of hundreds of IRBM's on some 24 cruisers, to supplement subs and SAC; new Polaris surface force might include battleships, by James Baar, M/R Associate Editor, 11/16/59, p. 13.

LAUNCHING—WHERE ICBM'S ARE WEAK; A "mix" of hard, mobile and dispersed sites is needed for protection from enemy missiles; a new "hard" Titan base is being designed, by Warren R. Stumpe, 10/26/59, p. 21.

ARMY ESTABLISHING MISSILE SUPPORT BASE IN FRANCE; by Anthony Vandyk, M/R Geneva Bureau Chief, 9/21/59, p. 81.

Production

FIBREGLASS WRAPPING LIGHTENS ATLAS: Rocketdyne achieves 25% savings in weight and cost of Atlas thrust chambers, and is developing the technique for use in solid powerplants as well, by Frank G. McGuire, M/R Associate Editor, 12/28/59, p. 18.

FLAME SPRAYER MELTS, DEPOSITS ANY MATERIAL; 12/28/59, p. 24.

PACKAGING INFLUENCES MSE CONCEPTS; "Packs" are boosting reliability and cutting costs, by Edsel F. Moffitt, 9/21/59, p. 49.

NEW IMPETUS IS GIVEN TO DRIVE FOR RELIABILITY; Military services plan to step up use of off-the-shelf components; NASA will stretch out firing schedules in effort to raise its batting average, by Jay Holmes, M/R Associate Editor, 9/14/59, p. 28.

COMPONENTS RELIABILITY: WHAT'S NEEDED?; editorial, 7/13/59, p. 50.

Target Facilities

CURTISS-WRIGHT DEVELOPS AN EXPENDABLE DRONE; by Frank McGuire, M/G Associate Editor, 12/21/59, p. 28.

Test & Checkout

PICTURE STORY OF TESTING AT ARDC'S TULLAHOMA WIND TUNNEL FACILITY; 12/21/59, p. 24.

BIG STATIC TEST STAND COMPLETED AT NOTS; 12/7/59, p. 21.

MISSILE MEET TESTS U.S. AIR DEFENSE; Near-combat conditions during William Tell II show at Tyndall AFB show value of weapons mix, but results don't reflect what would happen against real attacking planes carrying electronic counter-measures, by James Baar, M/R Associate Editor, 11/2/59, p. 14.

NAVY SAVES MONEY ON MISSILE TESTS; Weapon's Laboratory's short-cuts in testing and evaluating programs yield economies of millions of dollars and months of development time, by Hal Gettings, M/R Associate Editor, 11/2/59, p. 20.

AUTOMATIC TEST EQUIPMENT SOLVES LOGISTIC NIGHTMARE; Potential market is nearly one-half billion dollars, by George A. Peck, 9/21/59, p. 53.

WHO SHOULD DESIGN AND BUILD TEST STANDS AND GANTRYS? Big steel fabricators dispute role of missile makers in constructing rocket stands, by M/R Staff, 9/21/59, p. 40.

Test Ranges

PMR PLANS TO SPEND $256 MILLION; The nation's largest missile and space vehicle range includes only base from which polar launches can be made, will be heavily used by services and NASA, by M/R Staff, 9/21/59, p. 73.

Transportation

MINUTEMAN HANDLING MUST BE DELICATE; by Jay Holmes, M/R Associate Editor, 9/21/59, p. 45.

'ARTICULATION' SOLVES TALOS HANDLING PROBLEMS; High-speed movement from magazine to launching deck is engineered by an articulated rack driving huge hoist, by R. A. Burt, 9/21/59, p. 26.

SUPPORT VEHICLE REQUIREMENTS ARE TRICKY; Experts stress early design to meet complicated needs; a wide variety of vehicle combinations are available, by John J. MacRostie, 7/27/59, p. 17.

TRANSPORTING BIG BOOSTERS BY WATER; Plant-to-pad logistics is essential preliminary design consideration for multimegaton rockets; land and air movement is restricted, 11/16/59, p. 28.

PROPULSION

Advanced

I_{SP} MAY BE UPPED BY WIRE EXPLOSIONS; Company believes this propulsion method can provide more power than most proposed electrical systems offer; other uses seen in communication, attitude correction, 12/28/59, p. 20.

ION ROCKET SEEN USEFUL FOR SHIFTING ORBITS; NASA experts suggest low-I_{SP} devices for switch from 300-mile to 24-hour level, 10/26/59, p. 19.

ION ROCKETS LEAD IN 'EXOTIC' PROPULSION; Reported at the only open session of Second Symposium on Advanced Propulsion Concepts, jointly sponsored by Avco-Everett Research Laboratory and AF Office of Scientific Research. Papers are abstracted, 10/12/59, p. 28.

COST, HANDLING PROBLEMS KNOCK OUT BORON PROGRAM; Production curtailed after $200 million R&D expense, 8/17/59, p. 48.

ELECTRIC PROPULSION: MUCH THEORETICAL WORK IS STARTED; Although experiments are still in early stages, results so far are encouraging, by Ernst Stuhlinger, 7/20/59, p. 83.

Cryogenics

LINDE DEVELOPS A 'SUPER' INSULATION; Report on a new advance in cryogenic insulating materials, together with a guide to practical comparison of systems, by John F. Judge, M/R Associate Editor, 10/19/59, p. 28.

PRE-COOLING CRYOGENICS TO ELIMINATE COUNTDOWN? Survey of cryogenics support includes suggestion for retractable cooling jacket to prevent boiloff, by James A. Snyder, 9/21/59, p. 35.

NATION'S LIQUID HYDROGEN OUTPUT RISES; Industry-government cooperation is building large tonnage plants for the "ultimate" chemical fuel—until recently a laboratory curiosity, by Jay Holmes, M/R Associate Editor, 8/17/59, p. 21.

CENTAUR ENGINE BEGINS FULL SCALE TESTS; Scheduling calls for P&W to deliver first operational liquid hydrogen engine to Convair in 1960, by C. Paul Means, M/R Associate Editor, 8/3/59, p. 20.

WHERE ARE WE GOING IN FUEL HANDLING? The cryogenic engineer still must be a jack-of-all-trades with industry having to gear up for multi-million pound thrust boosters, by S. David Pursglove, 8/3/59, p. 28.

THE BRIGHT OUTLOOK FOR CRYOGENICS; Other systems are in the works, but the advantages of cryogenics will make them the most efficient for years to come, by Frank G. McGuire, M/R Associate Editor, 7/6/59, p. 21.

General

TEMPLE STUDIES HIGH TEMPERATURE FLAMES; A report on the intensive investigations conducted by the university's research institute with a rocket facility which could lead to high-energy breakthroughs, by William L. Doyle, 12/14/59, p. 17.

SERVOVALVES NEED FRESH APPROACH ON TEMPERATURE; Moog Valve believes 1000°F reachable by using acceleration switching servos, by Jay Holmes, M/R Associate Editor, 8/10/59, p. 34.

HOPE SUSTAINS RESEARCH INTO MONOPROPELLANTS; Interest continues despite the strange fuels' many disadvantages; "near-miracle" is hoped for, by S. David Pursglove, 7/27/59, p. 28.

CONTROL, GUIDANCE AND NAVIGATION: PROPULSION IMPOSES DESIGN; Inventiveness is needed most in prime problem areas of components hardware, by S. S. Edwards, W. C. Griffith and J. I. Osborne, 7/20/59, p. 63.

Hybrid

AEROJET PUSHING HYBRID LIQUID-SOLID ENGINES; 10/26/59, p. 20.

Igniters

THE DEMAND FOR NON-PYROTECHNIC IGNITERS; Electric, torch, hot spot, catalytic, and hypergolic systems have many uses in repetitive starts. Part II of a two-part survey, by Frank McGuire, M/R Associate Editor, 10/12/59, p. 20.

IGNITION KEEPS PACE WITH CHALLENGES; Trend is toward hypergolics for restarts and pyrotechnics for single-shots—both may be passed up in future systems. Part I of a two-part series, by Frank McGuire, M/R Associate Editor, 10/5/59, p. 30.

Liquid

WILL TITAN SWITCH TO STORABLE FUELS? How the pre-packaged liquid systems concept is profiting from advances in storable fuels and oxidizers; encapsulation techniques may be applicable, by John F. Judge, M/R Associate Editor, 11/16/59, p. 24.

LIQUID ENGINES: EMPHASIS REMAINS ON POWER, SIMPLIFICATION AND RELIABILITY; Cheaper oxygen-jet fuels will be dominant for some time because of tremendous consumption of rockets being designed, by Roy Healy, 7/20/59, p. 53.

Naval Torpedoes

TORPEDOES—NEGLECTED FACTOR IN ASW; Between wars we forget about them but they'll have to be vastly more sophisticated and reliable if they are to be equal to their mission in coping with missile submarine threat, by Hal Gettings, M/R Associate Editor, 8/10/59, p. 30.

Solids

AIR FORCE PUSHES FOR BIG SOLID BOOSTERS; Industry is expecting a decision soon on a feasibility contract for developing a one-million pound thrust rocket, by Jay Holmes, M/R Associate Editor, 11/30/59, p. 21.

SOLID FUEL TECHNOLOGY PROGRESS REPORT; Reliable propellants in operation give I_{sp} ranging from 240 to 250 sec.; new gains occur steadily; ARPA expects 20-30 sec. quantum jump from Project Principia, by Jay Holmes, M/R Associate Editor, 11/2/59, p. 24.

NO FUTURE FOR SOLIDS IN SPACE SHIPS; American Chemical Society hears that solids lack momentum needed for large vehicles. Convention also views advances in plastics, elastomers and polyurethanes, by John F. Judge, M/R Associate Editor, 9/28/59, p. 33.

BETTER METHOD DEVELOPED TO MEASURE SOLID CHANGES; Scientists at Stanford Research Institute have announced the development of an improved method of measuring creep and stress relaxation in solid propellants, by M/R Staff, 9/7/59, p. 15.

DOUBLE-BASE SOLIDS REMAIN STANDARD; Despite inroads by polyurethanes, a major part of the solid-fuel program relies on double-base composition. A report from the Naval Propellant Plant at Indian Head, Md., by Jay Holmes, M/R Associate Editor, 9/7/59, p. 16.

ARPA OBLIGATING $18 MILLION FOR SOLIDS RESEARCH; by Betty Oswald, M/R Associate Editor, 8/3/59, p. 14.

SOLIDS MANUFACTURERS LOOK TO FUTURE WITH CONFIDENCE; With problems being overcome, the role of solid fuels—already important in military applications—is expected to grow greatly, by Frank G. McGuire, M/R Associate Editor, 7/27/59, p. 31.

SPACE MEDICINE

Animal

SOVIETS LAUNCH AND RECOVER TWO DOGS AND A RABBIT; by M/R Staff, 7/13/59, p. 45.

Human

SOVIETS PREDICT TWO-COUPLE MOON ORBIT BY SPRING; German newspaper also quotes Red scientists as saying plans call for a two-man earth orbit by the end of this year; moon trip would coincide with Eisenhower visit, 10/26/59, p. 18.

THE FIRST MAN ON THE MOON; editorial, 9/7/59, p. 50.

THE CASE FOR MANNED LUNAR FLIGHT; A pair of NASA officials, speaking for themselves, argue that man can do more at less cost than instruments; they propose detailed plans, 8/31/59, p. 24.

SPACE MEDICINE: NOT KEEPING PACE WITH ENGINEERING; Several new sciences must be developed before man can travel safely through great distances in space, by T. C. Helvey, 7/20/59, p. 68.

Space Capsules

MERCURY NEEDS BASED ON SAFETY; NASA and capsule contractors pick laminated glass fiber and resin for heat shield, nickel cobalt for outside skin, titanium for inner vessel, by C. Paul Means, M/R Associate Editor, 11/23/59, p. 35.

CABIN CONDITIONING SYSTEM WEIGHED; British researchers find air-purifying, oxygen-replenishing system for a man would weigh 55 lbs. for 2 days, 235 lbs. for 10 days, 10/5/59, p. 26.

Space Suits

'LUNAR SUIT' PROPOSED FOR ASTRONAUTS; Martin Co. design provides environmental controls, communications and sensing equipment for emergencies expected on the moon, 11/16/59, p. 32.

STRUCTURES

Boosters

BOOSTER SCARCITY STALLS SPACE EFFORT; It will be two years before the U.S. can match present Soviet space efforts and it may take many years to catch up, by C. Paul Means, M/R Associate Editor, 12/7/59, p. 30.

Engines

FIBREGLASS WRAPPING LIGHTENS ATLAS; Rocketdyne achieves 25% savings in weight and cost of Atlas thrust chambers, and is developing the technique for use in solid powerplants as well, by Frank G. McGuire, M/R Associate Editor, 12/28/59, p. 18.

A PICTURE REPORT ON PRATT & WHITNEY'S XLR-115 ENGINE; 12/14/59, p. 19.

BIG ROCKETS MULTIPLY ENGINE SUPPORT NEEDS; Trend is toward reducing engine sophistication: but man-in-space, new fuels will demand new R&D, by Henry Gilfillan, 9/21/59, p. 28.

ENGINE CONTROLS ARE DEMANDING NEW ART; Environmental demands are running ahead of component improvements; much effort is given to improving servo loops, by Frank G. McGuire, M/R Associate Editor, 8/17/59, p. 23.

CLUSTERING: BIG PAYLOADS QUICKLY; Engines such as Saturn and Nova will add a greater degree of safety and reliability to manned space flight than the comparable single engine boosters, by C. Paul Means, M/R Associate Editor, 8/10/59, p. 21.

TV WATCHES ENGINE CASE TESTS; Newbrook Engine Corp. engineers learn how failure occurs by observing hydrostatic skin tests from safe vantage point, by Jay Holmes, M/R Associate Editor, 8/3/59, p. 15.

CENTAUR ENGINE BEGINS FULL SCALE TESTS; Scheduling calls for P&W to deliver first operational liquid hydrogen engine to Convair in 1960, by C. Paul Means, M/R Associate Editor, 8/3/59, p. 20.

Nozzles

NOZZLES POSE TOP WEIGHT PROBLEM IN ROCKET MOTORS; Today they account for some 30% of a solid motor's dead weight; varied research effort is aimed at reduction, by M/R Staff, 9/7/59, p. 13.

Rocket Cases

TITANIUM INCREASES PAYLOAD; by E. F. Erbin, 11/23/59, p. 61.

TITANIUM, PLASTICS GAIN IN ROCKET CASES; These materials may someday form boosters and second stages, although steel is still tops now because of its low cost and familiarity, by Jay Holmes, M/R Associate Editor, 10/12/59, p. 29.

MANAGEMENT AND GOVERNMENT

ABMA

ABMA TRANSFER PLAN IS READIED FOR PRESIDENT; 12/28/59, p. 19.

FUTURE OF SPACE PROGRAM STILL IN DOUBT DESPITE DECISION TO PUT ABMA UNDER NASA'S CONTROL; by William E. Howard, M/R Associate Editor, 10/26/59, p. 47.

FUND SHORTAGE DELAYS SATURN PROGRAM; ABMA Chief Medaris reports money bind caused postponement of first static test; President weighs agency's status, by Jay Holmes, M/R Associate Editor, 10/19/59, p. 14.

AIR FORCE, NASA MAY COMPETE FOR ABMA FACILITIES; But feeling at Huntsville, after initial jolt of Pentagon reshuffle announcement, is that major work will continue regardless of who's in control, by an M/R Correspondent, 10/12/59, p. 15.

ARDC

PICTURE STORY OF TESTING AT ARDC'S TULLAHOMA WIND TUNNEL FACILITY; 12/21/59, p. 24.

PARTING WORDS FROM MAJOR GENERAL JOHN W. SESSUMS, JR.; The retiring vice commander of ARDC looks into the missile future in an exclusive interview, by M/R Staff, 7/6/59, p. 16.

ARPA

ARPA TO CONTINUE IN MAJOR PENTAGON SPACE AND ADVANCED RESEARCH ROLE; by James Baar, M/R Associate Editor, 10/5/59, p. 28.

AIR FORCE GETS BULK OF SPACE PROJECTS; Details of ARPA's project assignments, 9/28/59, p. 9.

ARPA WANTS $550 MILLION FOR FISCAL YEAR 1961; Its chief troubles have been money and intramilitary squabbling over projects. Last of a series on Pentagon planning, by James Baar, M/R Associate Editor, 9/28/59, p. 21.

ARPA OBLIGATING $18 MILLION FOR SOLIDS RESEARCH; by Betty Oswald, M/R Associate Editor, 8/3/59, p. 14.

ARPA SEEKS 'BLUE SKY' DEFENSE AGAINST RUSSIAN MISSILES; More than $208 million has already been spent or earmarked for Project Defender—the search for something better than Zeus. Last of a two-part series, by James Baar, M/R Associate Editor, 7/13/59, p. 16.

Air Force

AF, NAVY FIGHT FOR TOP WEST COAST LAUNCHING ROLE; The Air Force wants to use Atlas pads at Vandenberg for polar-orbit launchings which would cross Navy's Pacific Missile Range facility at Point Arguello; Navy is already bothered by Vandenberg's effect on PMR. A special report by James Baar and William E. Howard, M/R Associate Editors, 12/21/59, p. 10.

DON'T MOURN THE B-70—NOT YET; editorial, 12/21/59, p. 50.

THE AIR FORCE REAPPRAISES THE TITAN PROGRAM; The Ballistic Missile Division reportedly has concluded the missile is basically sound and has place in defense plans; upshot may be thorough congresional investigation of entire ICBM picture, by William J. Coughlin, M/R, Los Angeles Bureau Chief, 12/21/59, p. 43.

AIR FORCE PUSHES FOR BIG SOLID BOOSTERS; Industry is expecting a decision soon on a feasibility contract for developing a one-million lb. thrust rocket, by Jay Holmes, M/R Associate Editor, 11/30/59, p. 21.

AIR FORCE SWINGS BACK INTO SPACE WITH AWARD OF ADVANCED DYNA-SOAR PROGRAM; by James Baar, M/R Associate Editor, 11/16/59, p. 49.

AIR FORCE LAYS DOWN SPACE POLICY; editorial, 10/19/59, p. 48.

FOR THE AF—ITS BIGGEST JOB; Editorial, 10/12/59, p. 49.

AIR FORCE GETS BULK OF SPACE PROJECTS; Details of ARPA's project assignments, 9/28/59, p. 9.

AIR FORCE WANTS ADDED BILLIONS AND AUTHORITY; It stresses third generation ICBM, military satellites, maneuverable vehicles, ALBM, and moon bases. First of a series on Pentagon planning, by James Baar, M/R Associate Editor, 8/17/59, p. 19.

BMD'S 'RADICAL APPROACH' TO ICBM PAYS OFF; Concepts of concurrency and central-direction responsibility produce ahead-of-time weapon systems, by Erica Karr, M/R Associate Editor, 8/3/59, p. 11.

SAC'S 'TRIGGER' NETWORK IS BEING DOUBLED; The Air Force is adding greatly to its communications system surrounding Eurasia and plans eventually to use satellites, by James Baar, M/R Associate Editor, 7/27/59, p. 12.

THE AIR FORCE 'INTEGRATION' EFFORT IN WEAPON SYSTEMS; The Aeronautical Systems Center takes over management responsibility after a system is okayed for production, by Betty Oswald, M/R Associate Editor, 7/13/59, p. 21.

Army

MEDARIS WOULD CUT 'MARGINAL' PROJECTS; by William J. Coughlin, M/R Los Angeles Bureau Chief, 11/23/59, p. 75.

TIME DRAWS NEAR FOR PAINFUL NIKE-ZEUS DECISION; Cold War strategy will dictate the White House choice of going ahead with the multi-billion-dollar AICBM program, trying to find a cheaper substitute, or doing without anti-missile defense, by James Baar, M/R Associate Editor, 10/26/59, p. 18.

ARMY ESTABLISHING MISSILE SUPPORT BASE IN FRANCE; by Anthony Vandyk, M/R Geneva Bureau Chief, 9/21/59, p. 81.

ARMY MAY HAVE TO DROP OUT OF SPACE; Shortage of funds and pressures of interservice rivalry could lead it to leave the space field soon and concentrate on other missions. Third in a series of Pentagon planning, by James Baar, M/R Associate Editor, 8/31/59, p. 11.

MISSILE SUPPORT: THE BIGGER PROBLEMS COMING WITH LARGER VEHICLES; Army Corps of Engineers has the responsibility for solving most of the engineering difficulties ahead. An interview with Maj. Gen. E. C. Itschner, Chief of Engineers, 7/20/59, p. 48.

A REPORT FROM US MISSILE TROOPS IN ITALY; Touring M/R Executive Editor Clarke Newlon writes from Vicenza, 7/13/59, p. 15.

HAWK AND LACROSSE ARE ADDED TO ARMY'S ARSENAL; Artillery units are organized in Texas to train in their use, by M/R Staff, 7/6/59, p. 28.

NIKE-ZEUS WILL COST $1.5 TO $2 BILLION PLUS IN FY '61; But Administration could decide to kill only anti-missile under development, by James Baar, M/R Associate Editor, 7/6/59, p. 24.

Budget

HOW THE PENTAGON WILL USE ITS MONEY IN 1960; The year will see the dropping of marginal programs and increasing mergers and consolidations within the industry; there will be more spending in some areas, by Betty Oswald, M/R Associate Editor, 12/14/59, p. 15.

NASA WAITS FOR MONEY TO DO ITS OVERALL SPACE JOB; The civilian space agency moves into the dominant role in U.S. space efforts and will have the engines and vehicles to do the job—if the Administration and Congress provide funds running into billions of dollars, by C. Paul Means, 11/9/59, p. 12.

ANOTHER THREAT TO OUR SPACE PROGRAM; editorial, 8/31/59, p. 52.

NASA BRACES FOR FIGHT TO RESTORE HOUSE BUDGET CUTS; Space agency worries over effect on research and Project Mercury but has high hopes Senate will undo the slashes, by C. Paul Means, M/R Associate Editor, 7/13/59, p. 11.

Congress

AUTHORIZATION 'RIDER' MAY DRAG OUT PROCUREMENT; Defense Department officials fear that additional Congressional test money may further complicate and slow down contract negotiations, by Betty Oswald, M/R Associate Editor, 8/24/59, p. 32.

INTEGRITY CANNOT BE LEGISLATED; Editorial, 8/24/59, p. 50.

THE BENEVOLENT TYRANNY OF CONGRESS; Editorial, 8/17/59, p. 50.

MANY MISSILE PROGRAMS CHANGED BY CONGRESS; by Betty Oswald, M/R Associate Editor, 8/10/59, p. 44.

HEBERT HAS HAND GRENADES READY TO TOSS; 'Munitions Lobby' inquisitors will try to match contracts and if they can—fireworks will start in earnest, by James Baar, M/R Associate Editor, 8/3/59, p. 10.

NO ACTION SOON ON INDUSTRIAL SECURITY; Three bills introduced in Congress but vote not expected before next session even in light of Supreme Court decision, 8/3/59, p. 16.

WHO OWNS MAN'S BRAIN; Editorial, 7/6/59, p. 7.

Contracts

HEBERT HAS HAND GRENADES READY TO TOSS; 'Munitions Lobby' inquisitors will try to match contracts and if they can—fireworks will start in earnest, by James Baar, M/R Associate Editor, 8/3/59, p. 10.

General

WE CAN CATCH RUSSIANS IN SPACE; Editorial, 12/14/59, p. 50.

PUBLIC AWAKENS TO SPACE LOSS; Editorial, 12/7/59, p. 52.

OUTWORN CONCEPT OF 'CLOBBERATION'; Editorial, 10/12/59, p. 50.

Industry

CURTISS-WRIGHT DEVELOPS AN EXPENDABLE DRONE; by Frank G. McGuire, M/R Associate Editor, 12/21/59, p. 28.

A PICTURE REPORT ON PRATT & WHITNEY'S XLR-115 ENGINE; 12/14/59, p. 19.

A CAPTIVE SMALL BUSINESS?; editorial, 10/26/59, p. 52.

VITAL NEWCOMERS OF THE SPACE AGE; editorial, 10/16/59, p. 52.

THE WARM SIDE OF THE COLD WAR; editorial, 9/14/59, p. 52.

A PICTURE REPORT ON THIOKOL'S UTAH DIVISION; Huge solid-propellant plant, less than two years old, sprawls over 11,000 acres, is 40% Air Force-owned, 9/14/59, p. 32.

SCIENTIST SPEEDS SPACE SOLUTIONS FROM GROUND UP; A profile of Dr. Arthur Kantrowitz, Avco research chief who specializes in saving time and money on ICBM programs; by Erica Karr, 8/31/59, p. 40.

BOWMAR LEADS PRECISION GEAR MANUFACTURE; Firm makes millions in work largely ignored by big missile manufacturers and its head views today's precision miniatures as mere prelude to future, 8/24/59, p. 21.

THE ABLE TO DELTA SUCCESS STORY; A history of the progress of the Aerojet-General system form four failures in the Vanguard program to a perfect batting average with Thor-Able, by Frank G. McGuire, M/R Associate Editor, 8/24/59, p. 22.

NATIONS LIQUID HYDROGEN OUTPUT RISES; Industry-government cooperation is building large tonnage plants for the "ultimate" chemical fuel-until recently a laboratory curiosity, by Jay Holmes, M/R Associate Editor, 8/17/59, p. 21.

NO ACTION SOON ON INDUSTRIAL SECURITY; Three bills introduced in Congress but vote not expected before next session even in light of Supreme Court decision, 8/3/59, p. 16.

INERT GAS BRAZING ROOM PROPOSED; Aerospace Industries suggest manufacturers study joint establishment of 'space room' for high temperature work on metals, 8/3/59, p. 22.

A FORMULA FOR RELIABILITY—PUT FIRST THINGS FIRST; An expert decries our misplaced emphasis on perfecting assemblies and urges priority for testing of materials, by John N. Dick, 7/13/59, p. 14.

Missile Business, Trends & Outlook

SAN DIEGO—MUCH MORE THAN AN LA SUBURB; A survey shows that the area is heavily involved in components manufacture and important in electronics, by Frank G. McGuire, 12/7/59, p. 25.

VAST MISSILE/SPACE EFFORT ON SAN FRANCISCO BAY; Area doesn't match Southern California in sheer number of manufacturers, but there's heavy participation, led by electronics, by Frank McGuire, 11/9/59, p. 16.

MISSILE WORK MUSHROOMS IN GREAT LAKES AREA; Electronics in Wisconsin, Minnesota; prime systems and sub-assemblies in Michigan, Ohio, Indiana; support in Illinois. Second of two-part series, by William E. Howard, M/R Associate Editor, 10/19/59, p. 17.

MICHIGAN FIGHTS FOR MISSILE DOLLARS; A state which once was the nation's chief arsenal has fallen out of step in defense work, but motor companies are leading comeback effort. Part I of a two-part survey of the Great Lakes area, by William E. Howard, M/R Associate Editor, 10/12/59, p. 18.

MISSILE/SPACE INDUSTRY PUSHES INTO SAN FERNANDO VALLEY; Electronics, R&D lead the move with construction of industrial parks and campus-like research centers. Second in a series on the Los Angeles area, 9/28/59, p. 12.

MISSILE/SPACE SPENDING YIELDS PEACETIME DIVIDENDS; A preliminary survey based on M/R questionnaires sent to hundreds of companies shows that the nation is already gaining new goods, techniques and industries from its investment in Cold War research and development, by Edward J. Michelson, 9/14/59, p. 13.

ORANGE COUNTY: NOWHERE TO GO BUT UP! Missile firms have turned the former farming community into the nation's fastest-growing metropolitan area, and the biggest development is yet to come. First of a four-part series on the Los Angeles area, by Frank G. McGuire, 9/7/59, p. 18.

MISSILE/SPACE R&D IS CAPITAL AREAS TOP PRIVATE INDUSTRY; Washington and its environs provide much of the brains behind missile production. Last of a series on the Middle Atlantic Area, by William E. Howard, M/R Associate Editor, 8/31/59, p. 19.

MISSILE WORK EXPANDS IN PENNSYLVANIA, NEW JERSEY; Both states earn upwards of $1 billion a year; astronics leads the continuing growth. Second of a series of Middle Atlantic states, by William E. Howard, 8/24/59, p. 30.

EAST FIGHTS FOR PRIME MISSILE CONTRACTS; Business amounts to $1 billion a year in New York alone, but there's a dearth of prime contracts. First of a series on the Middle Atlantic States, by William E. Howard, M/R Associate Editor, 8/17/59, p. 17.

USW: A $4-BILLION YEARLY MARKET; Many missile companies are realizing that this great technological challenge is as important as space flight and in the next few years will be just as expensive. Included is a list of market needs, by the M/R Staff, 8/10/59, p. 24.

$$$—BIGGEST BARRIER TO EFFECTIVE ASW; But industry hits other factors: Lack of consistency in requirements; and difficulty in getting state-of-the-art information, by William E. Howard, 8/10/59, p. 28.

MISSILES FILL A GAP IN CONNECTICUT; Intercompany cooperation highlights a still-growing activity that brings the Nutmeg State more than $500 million a year. Third in a series of regional surveys, by William E. Howard, M/R Associate Editor, 7/27/59, p. 14.

BOSTON WORKS TO BECOME THE 'HUB' OF SPACE RESEARCH; Many millions are spent here on missile/space research and production. Second in a series of regional surveys, by William E. Howard, M/R Associate Editor, 7/13/59, p. 12.

NEW ENGLAND'S MISSILE/SPACE MANUFACTURING BOOM; A state-by-state survey shows the Northeast's share of the business is over $1 billion a year, employing more than 150,000 people—and still growing, by William E. Howard, 7/6/59, p. 13.

NASA

BACKGROUND ON THE POSTPONED THOR-ABLE PROBE; NASA's planned sun orbiter, Thor-Able IV, could stay within tracking range until May, expanding communications know-how and providing new information on solar system, 12/21/59, p. 17.

VEGA OUT, HOPES PINNED ON CENTAUR; Delay in schedule thought to be primary reason for cancellation and reshuffling; the Air Force's Atlas-Agena will be used as an interim vehicle, by C. Paul Means, 12/21/59, p. 15.

NASA: DOD STREAMLINE BOOSTER EFFORT, by C. Paul Means, M/R Associate Editor, 12/14/59, p. 40.

BOOSTER SCARCITY STALLS SPACE EFFORT; It will be two years before the U.S. can match present Soviet space efforts and it may take many years to catch up, by C. Paul Means, M/R Associate Editor, 12/7/59, p. 30.

WHO SAYS THERE'S A SPACE RACE?; A condensation of a penetrating speech by Dr. Eberhardt Rechtin, Chief of the Telecommunications Division, Jet Propulsion Laboratory, NASA, summing up Soviet gains from space feats and calling on the United States to decide whether to drop out of space or accept the challenge—and its costs, 11/30/59, p. 26.

MERCURY NEEDS BASED ON SAFETY; NASA and capsule contractors pick laminated glass fiber and resin for heat shield, nickel cobalt for outside skin, titanium for inner vessel, by C. Paul Means, M/R Associate Editor, 11/23/59, p. 35.

NASA WAITS FOR MONEY TO DO ITS OVERALL SPACE JOB; The civilian space agency moves in to the dominant role in U.S. space efforts and will have the engines and vehicles to do the job—if the Administration and Congress provide funds running into billions of dollars, by C. Paul Means, M/R Associate Editor, 11/9/59, p. 12.

SATURN SWITCH TAKES MILITARY OUT OF LUNAR SPACE; Transfer of big rocket to NASA may commit United States to becoming a second class military space power, 11/2/59, p. 12.

FUTURE OF SPACE PROGRAM STILL IN DOUBT DESPITE DECISION TO PUT ABMA UNDER NASA'S CONTROL, by William E. Howard, M/R Associate Editor, 10/26/59, p. 47.

ION ROCKET SEEN USEFUL FOR SHIFTING ORBITS; NASA experts suggest low-I_{sp} devices for switch from 300-mile to 24-hour level, 10/26/59, p. 19.

NASA INSPECTION STRESSES WINGED RE-ENTRY R&D; Week-long event at Langley Research Center is highlighted by attention given winged vehicle research and by new trends in structures, shielding and propulsion, by M/R Staff Report, 10/19/59, p. 11.

NASA PLANS TO LAUNCH A SATELLITE NEAR VENUS; Thor-Able shot next month would be trackable beyond 50 million miles and could help restore U.S. prestige, by C. Paul Means, M/R Associate Editor, 10/19/59, p. 33.

SPACE SUPPORT MARKET ON THE RISE; NASA's support outlay has been limited so far because its vehicles have been modified missiles—but hundreds of millions may be spent in the '60's, by C. Paul Means, M/R Associate Editor, 9/29/59, p. 38.

ANOTHER THREAT TO OUR SPACE PROGRAM; Editorial, 8/31/59, p. 52.

NASA MAY TRY MOON ORBIT IN OCTOBER; Space agency to use Atlas-Able vehicle which was earlier scheduled for Venus probe, by C. Paul Means, M/R Associate Editor, 8/24/59, p. 33.

EXPLORER VI GIVES NASA NEW TRACKING CAPABILITY; Solar-celled power unit slated for deep space probe, 8/17/59, p. 46.

FROM LITTLE ACORNS; guest editorial by Dr. T. Keith Glennan, Administrator, NASA, 7/20/59, p. 184.

NASA BRACES FOR FIGHT TO RESTORE HOUSE BUDGET CUTS; Space agency worries over effect on research and Project Mercury but has high hopes Senate will undo the slashes, by C. Paul Means, M/R Associate Editor, 7/13/59, p. 11.

NASA SEEKS TO AID SMALL BUSINESSES; Officials of the space agency plan to keep tabs on company capabilities and keep them informed on upcoming contracts, by C. Paul Means, M/R Associate Editor, 7/6/59, p. 26.

NASA WANTS SMALL BUSINESS TO GET ITS SHARE; Civilian agency has good record in letting contracts to small firms and wants more on its buying list, 7/6/59, p. 26.

NATO

PROMISE OF NEW 'DECISION THRESHOLD COMPUTER'; Simple device performs well in NATO scatter stations and is expected to find application in telemetry especially over long distances, by Charles D. LaFond, M/R Associate Editor, 8/24/59, p. 18.

NATO'S STRENGTH BACKS WEST BERLIN, Editorial, 7/27/59, p. 50.

NBS

NBS STUDIES ELECTRIC ARC AS HIGH-TEMPERATURE SOURCE; 12/21/59, p. 22.

SPACE AGE CONTRIBUTIONS OF BUREAU OF STANDARDS; NBS serves government and industry by providing standards and calibration facilities demanded by extreme requirements of the new technology, by Hal Gettings, M/R Associate Editor, 12/14/59, p. 30.

NBS PRESSES RESEARCH ON DIELECTRICS; a broad study, partly funded by the Pentagon, is aimed at obtaining better measurements and materials, 10/19/59, p. 37.

Navy

ARGUELLO—PAST, PRESENT AND FUTURE; Details of PMR's Point Arguello facility, including first published pictures, by James Baar and William E. Howard, M/R Associate Editors, 12/28/59, p. 13.

AF, NAVY FIGHT FOR TOP WEST COAST LAUNCHING ROLE; The Air Force wants to use Atlas pads at Vandenberg for polar-orbit launchings which would cross Navy's Pacific Missile Range facility at Point Arguello; Navy is already bothered by Vandenberg's effect on PMR. A special report by James Baar and William E. Howard, M/R Associate Editors, 12/21/59, p. 10.

NEST FOR A BIRD: POLARIS CONTAINER; 12/21/59, p. 18.

NAVY SEEKS ANTI-MISSILE BIRDS, by James Baar, M/R Associate Editor, 12/14/59, p. 40.

POLARIS IN 1960; Highlights of final McElroy News session, by Betty Oswald, M/R Associate Editor, 12/7/59, p. 38.

RADAR OPERATIONAL SIMULATION KEEPS NAVY ALERT; Servonics device operational supplies realistic blips could be used in solving tactical problems, by William E. Howard, M/R Associate Editor, 11/30/59, p. 37.

NAVY PUSHES FOR BIG FLEET OF POLARIS CRUISERS; It urges eventual deployment of hundreds of IRBM's on some 24 cruisers, to supplement subs and SAC; new Polaris surface force might include battleships, by James Baar, M/R Associate Editor, 11/16/59, p. 13.

NAVY SAVES MONEY ON MISSILE TESTS; Weapons Laboratory's short-cuts in testing and evaluation programs yield economies of millions of dollars and months of development time, by Hal Gettings, M/R Associate Editor, 11/2/59, p. 20.

NAVY WANTS HUGE FLEET OF MISSILE SUBS, WARSHIPS; But tight money picture may force choice between limited-war carriers and proposed missile/space and USW development. Second in a series on Pentagon planning, by James Baar, M/R Associate Editor, 8/24/59, p. 36.

NAVY FAILS TO SOLVE ASW PROBLEM, Editorial, 8/10/59, p. 50.

PMR OUTLINES PLANS TO SPEND $30 MILLION; by Robert Mount, Special M/R Correspondent, 7/20/59, p. 32.

Pentagon—DOD

HOW THE PENTAGON WILL USE ITS MONEY IN 1960; The year will see the dropping of marginal programs and increasing mergers and consolidations within the industry there will be more spending in some areas, by Betty Oswald, M/R Associate Editor, 12/14/59, p. 15.

NASA, DOD STREAMLINE BOOSTER EFFORT, by C. Paul Means, M/R Associate Editor, 12/14/59, p. 40.

POLARIS IN 1960; Highlights of Final McElroy News Session, by Betty Oswald, M/R Associate Editor, 12/7/59, p. 38.

THE DOD TELLS INDUSTRY, Editorial, 11/30/59, p. 54.

AVCO'S IRVINE MAKES STRONG PLEA FOR UNIFIED COMMAND, 11/9/59, p. 14.

KEEP THE MILITARY IN SPACE ROLE, Editorial, 11/9/59, p. 50.

SATURN SWITCH TAKES MILITARY OUT OF LUNAR SPACE; Transfer of big rocket to NASA may commit United States to becoming a second class military space power, 11/2/59, p. 12.

ARPA TO CONTINUE IN MAJOR PENTAGON SPACE AND ADVANCED RESEARCH ROLE; by James Baar, M/R Associate Editor, 10/5/59, p. 28.

ARPA WANTS $550 MILLION FOR FISCAL YEAR 1961; Its chief troubles have been money and intramilitary squabbling over projects. Last of a series on Pentagon planning, by James Baar, M/R Associate Editor, 9/28/59, p. 21.

ARMY MAY HAVE TO DROP OUT OF SPACE; Shortage of funds and pressure of inter-service rivalry could lead it to leave the space field soon and concentrate on other missions. Third in a series of Pentagon planning, by James Baar, M/R Associate Editor, 8/31/59, p. 11.

AUTHORIZATION 'RIDER' MAY DRAG OUT PROCUREMENT; Defense Department officials fear that additional Congressional testimony may further complicate and slow down contract negotiations, by Betty Oswald, M/R Associate Editor, 8/24/59, p. 32.

NAVY WANTS HUGE FLEET OF MISSILE SUBS, WARSHIPS; But tight money picture may force choice between limited-war carriers and proposed missile/space and USW development. Second in a series on Pentagon planning, by James Baar, M/R Associate Editor, 8/24/59, p. 36.

AIR FORCE WANTS ADDED BILLIONS AND AUTHORITY; It stresses third generation ICBM, military satellites, maneuverable vehicles, ALBM, and moon bases. First of a series on Pentagon planning, by James Baar, M/R Associate Editor, 8/17/59, p. 19.

PICK YOUR WAR—THEN PLAN FOR IT; Pentagon's new instruction on industrial readiness planning leaves it up to individual services to choose type of war and make industry gear to match decision, by James Baar, M/R Associate Editor, 8/10/59, p. 16.

Procurement

DEFENSE STOCKPILE HITS PEAK, by Heather MacKinnon, M/R Editorial Assistant, 11/23/59, p. 71.

AUTHORIZATION 'RIDER' MAY DRAG OUT PROCUREMENT; Defense Department officials fear that additional Congressional testimony may further complicate and slow down contract negotiations, by Betty Oswald, M/R Associate Editor, 8/24/59, p. 32.

Weapons Systems & Facilities Management

MANAGEMENT—MAJOR SUPPORT PROBLEM; Editorial, 9/21/59, p. 122.